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Published for the Owners,

THE BOARD OF CONTROL OF BOTANICAL ABSTRACTS, INC.,

by

WILLIAMS & WILKINS COMPANY

BALTIMORE, U. S. A.

Entered as second-class matter, November 9, 1918, at the post office at Baltimore, Maryland, under the Act of March 3, 1879

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As a result of negotiations between a committee of three appointed by the Board of Control of Botanical Abstracts, at the Toronto meeting of the American Association for the Advancement of Science, 1921, and the publishers of BOTANICAL ABSTRACTS, the original agreement between the Board of Control and the Williams & Wilkins Company has been dissolved and a new five-year contract substituted.

The Williams & Wilkins Company had every legal right to continue the original agreement for the period of seven years, and the surrender of their equity, their full financial interest and the entire business control and management of the journal to the Board of Control is substantial evidence of a broad spirit of cooperation on the part of these scientific publishers. The publishers have taken the step with the idea that it will more fully, satisfactorily and completely serve the scientific interests concerned.

Through the splendid support of plant workers the Board of Control of Botanical Abstracts, Inc., has been able to meet the entire deficit incurred by the publishers in producing the journal. The new contract gives the Board of Control the full ownership, management and financial responsibility for the publishing of the journal, beginning with Volume XI, No. 1. The Board of Control becomes the owner of the entire reserve stock of the back numbers of the journal, with a subscription value of about \$7000.

The Williams & Wilkins Company are accorded the privilege of retaining their name on the cover of the journal as publishers for the owners for the period of the contract, and shall likewise have the right to manufacture the periodical under competitive conditions arranged by the Board of Control.

BOARD OF CONTROL OF BOTANICAL ABSTRACTS

BOTANICAL ABSTRACTS

A monthly serial furnishing abstracts and citations of publications in the international field of botany in its broadest sense.

UNDER THE DIRECTION OF

THE BOARD OF CONTROL OF BOTANICAL ABSTRACTS, INC.

J. R. SCHRAMM, Editor-in-Chief
National Research Council, Washington, D. C.

Vol. XI

MARCH-APRIL, 1922

No. 1

ENTRIES 1-886

AGRONOMY

C. V. PIPER, *Editor*

MARY R. BURR, *Assistant Editor*

(See also in this issue Entries 98, 123, 162, 236, 252, 254, 255, 263, 270, 298, 333, 338, 360, 362, 363, 584, 608, 613, 724, 729, 756, 770, 807, 830, 862, 886.)

1. ANONYMOUS. Fodder grass for swamp lands. Australian Sugar Jour. 13: 319 1921.—The states have thousands of acres of swamps, frequently rich and peaty, capable of conversion into profitable pastures. A number of grasses have been tried, but none can compete in water or very wet places with the native herbage, mostly non-nutritious rushes and sedges. Many of the grasses could not survive the frosts. A promising hardy swamp grass, *Poa aquatica*, native of England, parts of America, Europe, and Asia, is being introduced. This is a perennial, upright growing grass, attaining in Australian swamps a height of 9 feet and has a quantity of flag. Its strong root system helps it to compete successfully with all rushes, reeds, or sedges. It is recommended that the grass be disseminated in swamps by rootstocks; propagation by seed is not advised. It compares with Japanese millet (similar also in appearance) as a fodder. The governments of Western Australia and Tasmania have purchased roots, which are being planted in all states. In New South Wales it is recommended for trial to overcome water hyacinth in lagoons.—C. Rumbold.

2. ANONYMOUS. Grasses and clovers at Moss Vale. Agric. Gaz. New South Wales 32: 747. 1921.—Notes are given on elephant grass (*Pennisetum purpureum*), *Phalaris bulbosa*, Kikuyu grass (*Pennisetum clandestinum*), Shearman's clover (*Trifolium fragiferum* var.), and Chilean clover (*T. pratense perenne*).—L. R. Waldron.

3. ANONYMOUS. Potato synonyms. Gard. Chron. 69: 181. 1921.—Comment is made on the custom of giving old potato varieties new names. The report of the Potato Synonym Committee appointed by the National Institute of Agricultural Botany shows that out of 242 varieties tested 41 proved indistinguishable from "Up to Date," 20 indistinguishable from "Abundance," 17 indistinguishable from "British Queen," and 14 inseparable from "King Edward." Such renaming of old varieties causes much disappointment to purchasers. The committee is congratulated on its courage in making such a report. Potatoes of the Abundance type were immune to wart disease, those of the British Queen type susceptible, as were all of the Up to Date types. Of the varieties tested, 17 proved immune and 38 susceptible to wart. These trials have been continued over several years and no immune variety has been found

to become susceptible. A proposal to publish an annual handbook of synonyms has been approved by the Potato Conference and it is also proposed to add the names of producers, date of production, and parentage of new seedlings.—*P. L. Ricker.*

4. ANONYMOUS. **The yields of Irish tillage food crops since the year 1847. Part I.** Jour. Dept. Agric. Ireland 21:205-229. 8 fig. 1921.—This article discusses yield rate, area cropped, and various factors affecting the yield of potatoes, mangels, turnips, and cereals.—*Donald Folsom.*

5. ANONYMOUS. **The yields of Irish tillage food crops since the year 1847. Part II.** Jour. Dept. Agric. Ireland 21:289-305. 6 fig. 1921.—This report discusses yield rate and area cropped for potatoes, mangels, turnips, and cereals; the effects of social, economic, and legislative changes; insects and pests; quality of seed; and education.—*Donald Folsom.*

6. ANONYMOUS. [Rev. of: LEAKE, H. M. **The bases of agricultural practice and economics in the United Provinces, India.** viii + 277 p. W. Heffer & Sons: Cambridge, 1921.] Sci. Prog. [London] 16: 334. 1921.—This book deals particularly with the development of agricultural practice in India; but, because of its breadth, with the science of agriculture in general.—*Mary R. Burr.*

7. APPEL, O. **Die Pflanzkartoffel.** [The seed potato.] Landw. Hefte 35: 1-39. 7 fig. 1920.—The booklet contains information relative to the selection, handling, and care of seed potatoes, special attention being devoted to diseases important in the seed potato industry.—*Michael Shapovalov.*

8. ARNY, A. C. **Further experiments in field technic in plot tests.** Jour. Agric. Res. 21: 483-500. 1921.—This reports an investigation of the effect of cultivated alleys between plots on plot yields. Data obtained in connection with variety and rate of seeding tests show that border row yields were materially increased (as compared with the central rows) by 18-inch cultivated alleys, and that this effect extended to the 3rd 6-inch row. The removal of border rows is important in small plots since abnormally high yields obtained by their inclusion may change their ranking as determined by yield, and consequently the discard point.—*M. C. Gillis.*

9. BABOWITZ, KURT. **Ausbreitung des Futterpflanzenbaues zur Samengewinnung in Deutschland.** [Distribution of forage plants for seed production in Germany.] Mitteil. Deutsch. Landw. Ges. 36: 492-495. 1921.—As a result of a questionnaire the author is able to give the chief centers of seed production for various clovers, alfalfa, and some grasses. Cultural methods are described and average yields given.—*A. J. Pieters.*

10. BAL, CARLETON R. **The relation of crop-plant botany to human welfare.** Amer. Jour. Bot. 8: 323-338. 1921.—The author traces the development of botanical science and points out that although crop plants were studied by early botanists, they have been largely neglected by later ones. Emphasizing the very great value of crop plants to man in providing food, clothing, and shelter, the author reviews the plant families of most importance in this connection and urges the necessity for making a thorough botanical study of such plants, especially as regards taxonomy, physiology, and genetics.—*E. W. Sinnott.*

11. BARBER, C. A. **Florida as a sugar producer.** Internat. Sugar Jour. 24: 177-179. 1922.—The possibilities of Florida as a large sugar-making state are discussed. The sugar producing area is in the extreme southern portion of the peninsula, which has lately been drained. The climate is warmer than that of Louisiana, being almost free from frosts and having a growing season some two months longer. The land is easily drained and worked, but is perhaps too light for animal-drawn implements. Irrigation, if needed part of the year, should be easy, because of the lay of the land. Three to four million acres of land have been made tillable by draining the Everglades, and partially draining Lake Okechobee, a fresh water

lake equidistant from both coasts. There are two main factors to be considered when opening up a new sugar country: climate and soil. Geographically it is well placed, although not in the tropics. It is in the same latitude as Tucuman, South Queensland, the Nile Valley, Assam and Bihar, and nearer the equator than Zululand, where canes are grown. While not free from frost, the expanse of Lake Okeechobee and the presence of the Gulf Stream passing along the coast should give the region the mildness of an insular climate.

The rainfall is practically that of Louisiana, 58 inches. It is unfortunate in its distribution, as it increases steadily from winter to autumn, at which time of year as much as 22 inches fall. This drawback can be discounted by the longer growing season, which makes it possible to begin crushing as late as November. The soil conditions are peculiar, somewhat similar to Assam, and require careful consideration. An enormous mass of undecayed vegetable matter is present and in some respects the position is analogous to opening up land under a great forest. In tropical forest land the continued productivity largely depends on the preliminary stages of bringing the land under cultivation. It is possible within a few years, by letting in the air, sun, and rain, to dissipate the potential stores of nitrogenous material and render the reclaimed land useless. The forest has this advantage over the Everglades that, while in the Everglades the organic matter overlies pure sand, the forest generally has a more clayey substratum. Broadly speaking, the surface soil is an accumulation of organic remains with a lack of mineral plant food; this is underlain by pure sand and this in turn by thick layers of marl. The organic matter ranges from 1 to 16 and averages four to six feet in thickness. It is mainly formed by the ancient growth of a gigantic rush, *Cladium effusum*. This rush, called "saw grass," has grown upon itself, the recumbent grass mostly covered with water and free from decomposing bacteria. The organic matter is thus inert. When the land is drained and the soil dried the rush dies, its place is taken by a mass of coarse growing weeds. Under this weed flora and in the absence of surface water, bacterial decomposition of the organic matter begins. If dry soil conditions continue the weed flora passes into a growth of elder (*Sambucus canadensis*) and the soil grows more mellow. On old elder lands sugar cane can be grown. If left to nature a further stage occurs, the custard apple (*Anona glabra*) appears and a tropical jungle growth forms with continually improving soil. If, however, saw grass soil is drained and cleared for cultivation, these changes pass much more rapidly and although sugar cane may not grow as well as potatoes, corn and rice, it brings the soil into a more or less suitable condition. It is generally recognized in the tract that it is advisable to keep the ground covered in the dry period and it is claimed that, in case the nitrogenous material disappears too rapidly, leguminous crops have been shown to grow very well.—C. Rambold.

12. BARTLETT, H. A rotation for wheat farmers. Agric. Gaz. New South Wales 32: 775-776. 1921.—Practical suggestions for a wheat rotation in the western district are given.—L. R. Waldron.

13. BEVAN, W. Carob-sugar-candy or Pastelli. Cyprus Agric. Jour. 16: 57-58. 1921.—This simple, inexpensive, and profitable industry is carried out at Kazaphani, Karmi, Karava, and especially at Bellapais in the Kyrenia district. The process of converting the ripe carobs into carob honey and then into sugar-candy, or Pastelli, is described.—W. Stuart.

14. BEVAN, W. Flax. Cyprus Agric. Jour. 16: 55. 1921.—Attention is called to the large stocks of the previous year's flax fiber still unsold, and to the resulting reduced acreage. Representatives have been sent by the Agricultural Department to England with samples of the fiber. Excessive freight rates are thought to be responsible for failure to sell.—W. Stuart.

15. BEVAN, W. Sudan grass. Cyprus Agric. Jour. 16: 55-57. 1921.—This fodder plant has become very popular. The seed should be sown at a depth of about 1 inch and at the following rates per acre: In humid regions 20-25 pounds; in dry regions 12-25 pounds; on irrigated land 15-20 pounds. When grown for green food or hay it should be drilled 24 inches apart, 4-6 pounds per acre. The best sowing season in Cyprus is March-April. The best

time for cutting is from the beginning of flowering until full flower. The average period from seeding to cutting is 60-80 days; from 1st to 2nd cutting 45 days, from 2nd to 3rd cutting 50-55 days. When possible the crop should be watered after each cutting.—*W. Stuart.*

16. BEVAN, W. **Uses of soy beans.** Cyprus Agric. Jour. 16: 51. 1921.—In Japan and China and in some parts of India soy bean is second only to rice as native food. The Chinese are said to prepare a vegetable milk from soy beans for replacing animal milk in cakes, chocolate, and custards. Soy bean milk when sour can be used as buttermilk. The author also discusses using soy bean oil in compound lards and cooking fats; as a substitute for linseed oil; in explosives; for water-proof goods, rubber substitutes, printing ink, and as a fertilizer.—*W. Stuart.*

17. BLAKELY, W. F. **Newly recorded weeds.** Agric. Gaz. New South Wales 32: 731. 1921.—*Saponaria Calabrica* and *Silene noctiflora* are recorded for the 1st time in the province.—*L. R. Waldron.*

18. BREAKWELL, E. **Elephant grass or Napier's fodder.** Agric. Gaz. New South Wales 32: 483-490. 4 fig. 1921.—Elephant grass (*Pennisetum purpureum*), native to tropical Africa, may attain a height of 21 feet. Growth in warm weather is over 2 feet a week. Ripe seed is rarely secured in Australia. The plant, which stools heavily, resists drought but does not withstand hot winds. An analysis is given. Pasture trials have indicated its value in milk production. The grass is propagated best by rooted slips or cuttings. The annual yield is 70-80 tons of green feed per acre.—*L. R. Waldron.*

19. CHOMLEY, F. G., and F. A. CHAFFEY. **Producing lucerne hay under irrigation conditions. Methods and experiences at Yanco experiment farm.** Agric. Gaz. New South Wales 32: 387-390, 465-471, 560-564, 617-620. 19 fig. 1921.—Climatic, soil, and water conditions make the Murrumbidgee irrigation areas an important alfalfa center. Autumn seeding is practiced, seed being planted with a drill grass-seeder attachment, at 10 pounds per acre; 56 pounds of superphosphate are used per acre. The young alfalfa grows slowly during winter. Irrigations, accomplished by flooding except in preparing seed beds, are 1 or 2 per cutting, depending upon seasonal temperatures. From 4 to 6 weeks are needed for the growth of each cutting, and 7 cuttings are secured yearly. Hay is baled from the windrow. A good stand lasts 6-7 years. An average annual yield is 5 tons per acre.—*L. R. Waldron.*

20. CLARK, S. P. **Sweet clover in Arizona.** Arizona Univ. Circ. 34. 8 p. 1921.—In the U. S. A. sweet clover, though one of the oldest forage crops known, has only recently been used to any extent for hay and pasture. It has a wider climatic adaptation than any of the true clovers and will grow on practically any but acid soils. Sweet clover should be planted on a well-prepared and firm seed-bed. Inoculation is not necessary on soils previously grown to similar legumes. In Arizona fall and winter seeding is usually more successful than late spring seeding. Sweet clover is used principally for soil improvement and for pasture. Biennial white sweet clover is the principal variety grown for hay.—*Mary R. Burr.*

21. COCKAYNE, A. H. **The beet sugar industry.** New Zealand Jour. Agric. 22: 6-12. 1921.—Several districts in New Zealand appear to have suitable soil and climatic conditions, but there must be assurance of a large acreage devoted to the crop. Methods of growing, cost of production, and cost of sugar manufacture are discussed.—*N. J. Giddings.*

22. CONNER, A. B., and R. E. KARPEN. **Type and variability in kafir.** Texas Agric. Exp. Sta. Bull. 279. 14 p. 1921.—This is a statistical study of type and variability of certain characters in the kafir plant, the data presented having been obtained at Texas Substation No. 8, near Lubbock. This kafir breeding project, begun in 1915, involved, in the following 5 years, measurements of material from crib-run heads and of the progeny of the different classes of population successively inbred for the different characters. The characters studied include number and length of seed branches, number of nodes, and length of rachis.—*Mary R. Burr.*

23. CROSS, W. E. The possibilities of the Java seedling canes in Louisiana. [Translation from Rev. Indust. y Agric. Tucumán 11: 118. 1921.] Internat. Sugar Jour. 23: 614-616, 1921.—The good qualities of the Java seedlings POJ 36 and 213 are discussed and summarized.—C. Rumbold.

24. DALGLIESH, C. S. Grassing of beech-bush hill country. New Zealand Jour. Agric. 22: 13-15. 1921.—This section is overrun with fern, and the soil is lacking in lime and phosphorus. Experiments in establishing grass indicate that Chewings fescue, fiorin, and *Poa pratensis* are particularly desirable.—N. J. Giddings.

25. DOWNEY, U. J. Annual reports of the Hettinger agricultural experiment substation, 1919 and 1920. North Dakota Agric. Exp. Sta. Bull. 150. 15 p., 5 fig. 1921.—In 1919 wheat on all plats was Kubanka, pure line selection. Seedlings were failures, except where the crop followed cultivated crops or was grown on summer tillage. Maximum yield was 8 bushels per acre. There was no wheat failure in 1920, when the maximum yield was 21.5 bushels. All oat seedlings were failures in 1919 except on 1 plat preceded by fallow. Maximum yield of oats in 1920 was 50 bushels per acre; a pure line selection of Early Mountain was used. No failures in yields of barley are reported. In 1919 and 1920 northwestern dent corn was harvested as silage, average yields being: in 1919, 2880 pounds green material per acre, in 1920, 8300. In trials of forage crops, Dakota amber sorghum gave a maximum yield in 1919 of 4390 pounds air-dry material per acre; in 1920, 4640 pounds. Sunflowers produced 9680 pounds green material per acre in 1920. In 1919 potato varieties averaged 59 bushels per acre, in 1920, 91 bushels; Early Ohio gave the greatest yield both years. In flax rotations flax was a failure or nearly so in 1919, but in 1920 produced yields up to 12.5 bushels per acre. Grimm alfalfa yielded higher than the Excelsior variety. Brief notes are given on trees and shrubs.—L. R. Waldron.

26. DUCOMET, V. Sécheresse et plant de pomme de terre. [Drought and results on production of potato tubers.] Bull. Soc. Path. Vég. France 8: 55-57. 1921.—The author recommends planting potato varieties (*Solanum tuberosum*) which have been tested in France and are known to be adapted to the environment and peculiar demands of the country.—Jean Dufrenoy.

27. EASTERBY, Frost-resistant Indian sugar cane. Australian Sugar Jour. 13: 336 1921.—A variety of sugar cane, Shahjahanpur No. 10 (from the Shahjahanpur Sugar Experiment Station, India), recommended as adapted to cold weather conditions, was found to resist severe frosts at Bundaberg Station. The sugar content and cropping qualities are good. An analysis showed: Brix, 21.7; purity of juice, 91.0; percentage of fiber in cane, 13.6; commercial cane sugar, 15.05 per cent.—C. Rumbold.

28. ETHERIDGE, W. C. Characters connected with the yield of the corn plant. Missouri Agric. Exp. Sta. Res. Bull. 46. 17 p. 1921.—No significant difference was found in the yield produced by 7 different types of seed ears of Boone County White corn grown in 1914. Correlations determined for various plant characters and yield of shelled grain per plant were mostly insignificant, though the coefficient of correlation for number of days from planting to silking and yield per plant was -0.4181 ± 0.0133 . In another study, conducted in 1910 and 1911 with the same variety, ears with deep, narrow, and starchy kernels showed a slightly higher shelling percentage than ears with shallow, wide, and horny kernels. Little difference in the relative shrinkage of ears of different types was found. Large and heavy ears lost moisture more rapidly than the contrasting extremes. Smooth, shallow, and horny kernels germinated better than rough, deep, and starchy kernels, respectively, and kernels with small germs germinated better than kernels with large germs. All ears used in the germination study were of low viability. They were 2 years old, had been harvested late in the season, stored 3 months in a crib, and fumigated several times thereafter with hydrocyanic acid gas.—L. J. Stadler.

29. EVANS, L. A. Report for 1920-21: Rept. Agric. and Stock Dept. Tasmania 1920-21: 1-6. 1 pl. 1921.—Statistical data for the year on culture and production of cereals, fruits, potatoes, sugar beets, and hops are given. Tasmanian wheat flour is discriminated against by local bakers because it absorbs less "liquor" and yields fewer loaves to the bag than flour with an admixture of mainland (Australian) wheat.—In government contests the prize for wheat production was won in the northern area with variety Purple Straw, which yielded 44.25 bushels to the acre, and in the southern area with variety Federation, which yielded 54.5 bushels to the acre.—Potatoes average about 2.5 tons to the acre, some up to 8 tons. Only 1 case of blight (*Phytophthora*) is noted and other diseases were not observed.—D. Reddick.

30. FELLERS, C. R. Soy-bean oil: Factors which influence its production and composition. Jour. Indust. and Eng. Chem. 13: 689-691. 1921.—Soy bean oil, a semi-drying oil consisting largely of the glycerides of palmitic, oleic, linolic, and linoleic acids, may be used to replace linseed oil in manufacturing paints and varnishes. The domestic oil is practically identical chemically and physically with the imported oil.—Henry Schmitz.

31. GENNYS, R. H. Wheat growing in New England. Agric. Gaz. New South Wales 32: 457-463. 1921.—The author describes methods of wheat growing in the New England district of New South Wales with especial reference to general crop rotation. Varieties of hard red spring wheat, such as Power, Fife, and Marquis, deteriorate rapidly in milling and baking qualities after introduction and soon are on a par with local varieties. Estimates of cost of production are given for both grain and "chaff."—L. R. Waldron.

32. GOY. Verfütterung von Brasilbohnen. [Feeding Brazil beans.] Mitteil. Deutsch. Landw. Ges. 36: 661-662. 1921.—Two kinds of Brazil beans have been offered in Germany, both varieties of *Phaseolus vulgaris*, one a small, flat, chocolate-colored bean, the other, larger, reddish-brown, and sometimes spotted. In Brazil they are said to be known as "Mulatinos." Both kinds were tested, both raw and cooked, in feeding horses, swine, and cattle. Horses would not eat the beans or feed containing small quantities of them. Swine while not liking the beans would eat them and suffered no ill effects from as much as 5 pounds at a ration for half-grown hogs. Cattle ate both crushed raw and cooked beans, but the use of the former is condemned because of some reported ill effects, possibly due to phasin, a nitrogenous substance little known but said to occur in garden beans. No effect on milk production was noted, but only small amounts of beans were used. A chemical analysis of Brazil beans is appended.—A. J. Pieters.

33. GREEN, A. W. Development of swamp land at Ruakura. New Zealand Jour. Agric. 22: 1-5. 4 fig. 1921.—The most difficult problem encountered was getting a stand of desirable grass. Attention to fertilizing and seeding has given very good results.—N. J. Giddings.

34. GRIMME, CLEMENS. Über Maniokmehl. [Tapioca flour.] Zeitschr. Untersuch. Nahrungs- u. Genussmittel 41: 172-175. 1921.—This account of the distribution of *Manihot utilissima* Pohl and *M. palmata* Mueller, and of the preparation and uses of their products includes a list of common and vernacular names for tapioca and analytical data on various types of tapioca products.—E. E. Stanford.

35. GUTHRIE, F. B., and G. W. NORRIS. Notes on wheats entered for the Royal Agricultural Society's show, Easter, 1921. Agric. Gaz. New South Wales 32: 717-724. 1921.—Data since 1905 show no deterioration in quality of Australian wheats. Wheats were scored on weight per bushel; appearance of grain; trueness to type; uniformity; ease of milling; percentage, color, and strength of flour; and percentage of dry gluten. The 62 wheats tabulated had an average bushel weight of 66 pounds. The best wheat exhibited was Cedar of the strong red class, which scored 91.5 per cent.—L. R. Waldron.

36. HALL, W. H. **Maize in rotation.** Jour. Dept. Agric. Union of South Africa 2: 533-534. 1921.—The author reports the progress of cooperative experiments with maize in rotations on 3 farms in Natal. The results are fairly consistent in indicating the value of cowpeas in increasing the yield of maize.—*E. M. Doidge.*

37. HONEAMP, F. **Über den Einfluss des Futters auf Menge und Zusammensetzung der Milch, insonderheit auf deren Fettgehalt.** [Influence of feedstuffs on amount and composition of milk, especially as to fat-content.] Zeitschr. Untersuch. Nahrungs- u. Genussmittel 41: 17-26. 1921.—In this discussion of the effects of feeding corn and its by-products, palm-kernel, coconut-cake, linseed, and poppy-seed cake, as well as war-time feedstuffs on milk yield, the author concludes that no definite influence of feedstuffs on amount, composition, or fat-content of milk can be traced.—*E. E. Stanford.*

38. HUDELSON, R. R., and C. A. HELM. **Crop rotations for Missouri soils.** Missouri Agric. Exp. Sta. Bull. 183. 27 p., 10 fig. 1921.—This discussion of the advantages of crop rotation and recommendations for crop rotations under various conditions in Missouri are based partially on experimental results reported in Bulletin 182.—*L. J. Stadler.*

39. JAMES, F. A. **Sweet clover.** Amer. Bee Jour. 61: 364. 1921.

40. KELLER, G. N. **Tobacco growing in Ireland. The experiments in 1920.** Jour. Dept. Agric. Ireland 21: 200-204. 1921.—Detailed conclusions are given regarding the various operations concerned with the growth and sale of the crop.—*Donald Folsom.*

41. KERLE, W. D. **Farmers experiment plots. Potato experiments, 1920-21. Upper north coast district.** Agric. Gaz. New South Wales 32: 609-615. 1921.—Detailed accounts of variety and manurial trials conducted on 9 private farms are given. Yields were reduced at 2 points by late blight (*Phytophthora infestans*). At least 8 varieties, including Factor, Up-to-date, and Carman No. 1, were on trial at all points. Use of phosphatic manures gave significant increases in all cases. Applications of 500 pounds superphosphate per acre gave the largest net increase in 5 out of 7 trials.—*L. R. Waldron.*

42. KRAFT, ADOLF. **Der Einfluss der Nährstoffe auf die Qualität der Kartoffel.** [Effect of nutrients on the quality of potatoes.] Arbeit. Forschungs-inst. Kartoffelbau 3: 1-73. 1920.—Manuring affects the composition of the potato, the greatest effect being shown by potassium and nitrogenous fertilizers, a lesser one by phosphoric acid and lime. One-sided potassium manuring acted depressingly on the dry substance, starch, and protein contents, increasing the percentage of water and minerals, and changing unfavorably the flavor. These conditions were reversed in the absence of potash. One-sided nitrogenous fertilizing increased the protein content and decreased ash and raw fiber content. Lack of nitrogenous matter lowered the dry matter, starch, and protein content and increased the mineral content, and the tubers showed more scab than when a rich nitrogenous fertilizer was used. Thomas slag produced a very high dry substance and starch content and very high protein content; superphosphate, on the contrary, lowered the protein content about 50 per cent. Stable manure and green manure acted very favorably on the quality.—*Michael Shapovalov.*

43. LEHFELDT, R. A. **Agricultural economics.—Cost of production of maize.** South African Jour. Sci. 17: 201-204. 1921.—The author advocates the practice of cost-accounting for farmers and gives examples from a number of farms.—*E. M. Doidge.*

44. McCauley, C., and J. DOUGLASS. **Field experiments with wheat. Cowra and Nyngan experiment farms.** Agric. Gaz. New South Wales 32: 480-482. 1921.—The object of these experiments was to secure data on best varieties for hay and grain. Weather conditions were such as to preclude definite conclusions.—*L. R. Waldron.*

45. MCGILLINRAY, R. Dry farming. New Zealand Jour. Agric. 22: 19-24. 5 fig. 1921. —Large areas of land in New Zealand are well suited for dry farming. Experiments on small tracts have given increased yields of 400-600 per cent.—N. J. Giddings.

46. MAHMUD, RAJA BIN RAJA ALI. Padi varieties and padi breeding. Agric. Bull. Federated Malay States 8: 164-173. 1920 [1921].—This account of the races of *Oryza sativa* grown in the Malay Peninsula includes suggestions for improvement.—I. H. Burkill.

47. MANGELS, C. E. The mineral constituents of potatoes and potato flour: Effect of process of manufacture on the composition of the ash of potato flour. Jour. Indust. and Eng. Chem. 13: 418. 1921.—In so far as mineral constituents are concerned, the nutritive value of potato flour is practically the same as that of the fresh potato.—Henry Schmitz.

48. MARSH, L. G. Possible uses of corncob cellulose in the explosive industry. Jour. Indust. and Eng. Chem. 13: 296-298. 1921.—It appears that the only use for corncob cellulose in the explosive industry at present is as a carbonaceous absorbent for liquid ingredients such as nitroglycerin in the manufacture of dynamite.—Henry Schmitz.

49. MUNDY, H. G. The interdependence of crop rotation and mixed farming. Rhodesia Agric. Jour. 18: 343-349. 1921.—The author advocates crop rotation and farmyard manures, and states that "the only practical method by which soil fertility can be economically maintained is by adopting mixed farming, which insures the feeding on the farm of a proportion of the crops raised, as against the selling off of such crops."—E. M. Doidge.

50. OLDAKER, C. E. W. Potato culture. Dept. of Agric. Tasmania Bull. 95. 4 p. 1920. —Decreased potato yields in Tasmania are attributed to poor soil conditions due to long continued planting to cereal crops and potatoes and to antiquated cultural methods. Green manuring, subsoiling, fertilizing, thorough cultivation, care in the selection of seed and varieties, proper storage, precautions against insects and diseases, and eradication of weeds are among the suggestions presented for increasing production and improving the land.—Mary R. Burr.

51. PINN, A. J. Experiments in cold storage of potatoes. Agric. Gaz. New South Wales 32: 692. 1921.—Potatoes kept in cold storage deteriorated rapidly after removal, due apparently to the collapse of the cells on exposure to summer conditions.—L. R. Waldron.

52. PITT, J. M. Farmers' experiment plots. Potato trials, 1920-21. Lower north coast. Agric. Gaz. New South Wales 32: 473-479. 1921.—Brief notes of potato trials conducted on 13 private farms are given. The varieties Factor, Up-to-date, and Brownell's Beauty gave best results. The best manurial results were obtained with equal parts superphosphate and bonedust or with a mixture of superphosphate and sulphate of potash. Yields were reduced by too close spacing of hills. Seed tubers which had been "greened" by exposure to sunlight showed increased yield over the controls. Large, whole tubers for seed outyielded small, whole tubers, and whole tubers outyielded half-sets of similar weight.—L. R. Waldron.

53. POWERS, W. L. and W. W. JOHNSTON. Irrigation of potatoes. Oregon Agric. Exp. Sta. Bull. 173. 28 p., 9 fig. 1920.—These investigations were carried on at Corvallis, Oregon, over a period of 12 years. The rainfall during the growing season, April 30-Oct. 1, is 5.5 inches, the average evaporation for this period 24 inches. The silt loam soil on which these experiments were conducted has a maximum capillary water content of about 34 per cent, an optimum moisture content of about 24 per cent, and a wilting point of about 14 per cent. The minimum moisture content under field conditions is 10 or 11 per cent. Irrigation gave a higher seasonal moisture content, and this was associated with higher yields. Light, frequent irrigations gave most economical returns; 1 inch every 10 days is good practice for gardens. Water requirements can be greatly reduced in irrigation farming by practicing a good rota-

tion, including legumes, by maintaining a good state of fertility and tilth, and by irrigating at the right time and in proper amount. Palatability and marketability of potatoes are not injured by proper irrigation.—“Heavy irrigation increased the moisture content of the tubers, caused a higher proportion of vines to tubers, and a slight change in the chemical composition of the product.” “Proper irrigation has decreased the percentage of culls.” “Irrigation, to be of much value in the Willamette Valley, must be used only in a supplemental and proper way.”—C. E. Owens.

54. PRIDHAM, J. T. Descriptions of new varieties of cereals. *Agric. Gaz. New South Wales* 32: 699-703. 2 fig. 1921.—The wheat varieties described, derived mainly from crosses made at Wagga and Cowra, are as follows: Forelock, Riverina, Early Bird, Waratah, Aussie, Stamina, Union, Nullah, Bald Knob, Wandilla, Ghurka, and Warrah. Oat varieties described are: Yarran, Wilga, Quandong, Mulga, Myall. Barley varieties, Trabut and Pryor, and the rye variety, Slav, are described.—L. R. Waldron.

55. PRIDHAM, J. T. Increased production in the West. *Agric. Gaz. New South Wales* 32: 693-694. 1921.—The author discusses the best cereals for hay in the vicinity of Nyngan, where it is too dry to produce wheat for grain.—L. R. Waldron.

56. PRIDHAM, J. T. The size of seed in relation to wheat yields. *Agric. Gaz. New South Wales* 32: 616. 1921.—Results are given of an experiment begun in 1898 by N. A. Cobb, who planted large and small grains sorted from 3 wheat varieties. Each year in each case the largest grains from large grain row and the largest and smallest grains from small grain row were planted. Yields are given for 10 years. There were no significant differences in the yields from the largest grains. Yields from the smallest grain from small grain rows were markedly less. No deterioration was noticed in using small seed.—L. R. Waldron.

57. REYNOLDS, E. B. Corn variety experiments, Substation 3, Angleton, Texas. *Texas Agric. Exp. Sta. Bull.* 276. 15 p. 1921.—This station is 18 miles from the Gulf and 38 miles southwest of Galveston. The topography is flat with poor drainage, the farm being about 22 feet above sea level. The soil, black clay with gray or dark clay subsoil, called Victoria clay, is somewhat deficient in phosphorus, but contains fairly large quantities of potash and lime. The rainfall in 1917 was 22.74 inches, in 1919 66.79 inches; the average for the 7 years of the investigation was 45.57 inches. Tables are given showing the yields of each of the 11 best varieties for early, medium, and late planting for 1918, 1919, and 1920, and the corn varieties tried for 7 years are listed and the best described.—L. Pace.

58. REYNOLDS, MARK H., and R. N. MAKIN. Farmers' experiment plots. Maize experiments, 1920-21. Tamworth and northern tableland districts and south coast. *Agric. Gaz. New South Wales* 32: 695-698. 1921.—In the tableland districts the varieties Golden Glow and Wellingrove gave the best results. In the south coast district Funk's Yellow Dent, Golden Beauty, Leaming, and Silvermine did well; the 1st named in 1 locality produced a maximum of 130 bushels per acre. At only 1 point was the expense for fertilizer warranted.—L. R. Waldron.

59. RICHTHOFEN, VON. Zur Kohlenstoffernährung Kulturpflanzen. [On carbon assimilation of cultivated plants.] *Mitteil. Deutsch. Landw. Ges.* 36: 620-621. 1921.—The author discusses the application of manure from a practical standpoint, giving the results of different methods used. Best results were secured by working the manure into the surface after plowing.—A. J. Pieters.

60. RIEHM, E. Vorsicht beim Einkauf von Winterweizen und Wintergerste. [Care in buying winter wheat and winter barley.] *Mitteil. Deutsch. Landw. Ges.* 36: 527. 1921.—The author calls attention to the need of buying smut-free seed or of treating smutty seed with hot water. Details for treatment are given.—A. J. Pieters.

61. RUCKDESCHIEL. *Erfolge der Wechselwiesenwirtschaft im Fichtelgebirge*. [Results of rotation-meadow farming in the Fichtelgebirge (N. Baravia).] *Mittel. Deutsch. Landw. Ges.* 36: 656-659. 1921.—The author recounts his experience in improving a very poor farm by using artificial fertilizers and a system of rotation meadows.—A. J. Pieters.

62. RUSSELL, E. J. *Science and crop production*. *Nature* 108: 116-120. 2 fig. 1921. [Abstract from Farmer's Lecture at British Association meeting, Sept. 7, 1921.]—This is a popular review of fertilizer experiments since 1843. The old view was that the effect of fertilizers was proportional to the amount applied, but Lawes and Gilbert showed that the yield falls off after a certain point. A later view, due to Mitscherlich, was that the first effect was large, a decrease following. At present it is believed that there is first a small increase followed by a greater and then by a smaller effect.—O. A. Stevens.

63. SHEPHERD, A. N. *Farmers' experiment plots. Sudan grass trials, 1920-21. Murrumbidgee irrigation areas*. *Agric. Gaz. New South Wales* 32: 713-716. 1921.—Experiments were conducted on 5 private farms. Fertilizers were used on nearly all plots. The heaviest yields were secured when the seed was sown in rows 3 feet apart as this allowed furrow irrigation and cultivation. In a grazing trial 6 acres carried 32 head of milch cows for 58 days and 24 head for 15 days, the grazing periods alternating with periods of rest for the pasture. The fertilized plots yielded decidedly higher than the control plot.—L. R. Waldron.

64. SHEPHERD, A. N., H. BARTLETT, W. D. KERLE, and J. M. PITT. *Farmers' experiment plots. Maize experiments, 1920-21*. *Agric. Gaz. New South Wales* 32: 777-790. 3 fig. 1921.—In the Murrumbidgee irrigation area 11 varieties were tried, with a maximum yield of 77 bushels from Fitzroy. Superphosphate (280 pounds per acre) gave a 50 per cent increase in yield over no manure. Maize in this area is planted both fall and spring. In the western district, 8 varieties were grown at Gregra, maximum yield of 31 bushels per acre being produced by Brewer's Yellow Dent. Maize-growing in this district is very limited. In the upper north coast district, very heavy rains interfered with the experiments. Results are given from 8 farms. High-yielding varieties were Fitzroy, Ulmarra White-cap, Hickory King, and Large Red Hogan. Manurial trials were contradictory. In the central coast district Fitzroy gave consistent high yields. At 1 point mineral manures gave an increased yield of 50 per cent.—L. R. Waldron.

65. TAYLOR, W. H. *Selection of seed potatoes*. *New Zealand Jour. Agric.* 22: 42-43. 1921.—Popular information is given as to potato selection.—N. J. Giddings.

66. THATCHER, R. W. *The outlook for agricultural research*. *Science* 54: 613-617. 1921.—The author discusses the importance of and outlook for agricultural research, and the 2 principal agencies for it,—namely, experiment stations and graduate schools of land-grant colleges,—and defines the field covered by each. In the experiment stations the aim of research is definite economic progress; that of the graduate schools is chiefly the training of graduate students in methods of critical investigation; and that of individual research work is the promotion of individual professional standing and welfare. The author feels that the environment provided by the experiment station organization is more favorable to agricultural research than that of any other agency and urges that the agricultural research of the land-grant colleges be so definitely organized that an environment most favorable to successful research work may be created.—Mary R. Burr.

67. WALDRON, L. R. *Some physical and chemical studies of certain clones and sibs of brome-grass*. *North Dakota Agric. Exp. Sta. Bull.* 152. (Res. Bull. 1) 28 p., 11 fig. 1921.—Certain striking individual plants of smooth brome-grass (*Bromus inermis*) were taken from among several thousand brome plants, were grown individually, propagated vegetatively, and grown in clonal beds. A bed of timothy was grown for comparison. Yields from 5 cuttings made in 3 years showed that some of the clonal beds decidedly outyielded others. Cer-

tain clones are much better suited to furnish breeding and selection material than others, provided desirable characters appear sufficiently pronounced in succeeding generations when obtained through self-fertilized seed. The relation of type to yield and to desirability for hay and pasture purposes is discussed. Chemical studies made upon the different brome-grass clones showed striking variations for different components. Certain high yielding clones carried a high percentage of protein; 1 high yielding clone produced nearly 3 times as much protein per acre as did a low yielding one. There seemed to be positive correlation between yield and protein content. No other components showed such striking and important variations. Ash analyses showed decided variations for different clones, especially in phosphorus and sodium. One clone carrying 16 per cent crude protein, dry matter, was also high in all ash elements. Composition of clonal brome-grasses, of timothy, and of commercial brome-grass is compared. Sibs generally outyielded clones the 1st year, but the 2nd year yields of the 2 were about equal. Measurements of leaf blades showed greater leaf area for clonal leaves but greater variability for leaves of sibs. It may be possible to use differences of variability to determine closeness of inbreeding when other conditions are similar.—*L. R. Waldron.*

68. WARD, F. E. **Lucerne in the Wairarapa.** *New Zealand Jour. Agric.* 22: 39-40. 3 fig. 1921.—This is a report on some successful demonstration plots.—*N. J. Giddings.*

69. WENHOLZ, H. **A new method for determining yields of experiment plots.** *Agric. Gaz. New South Wales* 32: 490-502. 1921.—In a series of field plots, check plots are given (usually) a systematic distribution. A "calculated" or "natural" yield is determined for each plot on the basis of check plots. The average of the calculated yields indicates what an entire plot should yield if sown entirely to checks or controls, and the ratio of the calculated to the actual yield for each plot multiplied by the average of calculated yields gives the yield for each plot as affected by the experiment and corrected for soil heterogeneity.—*L. R. Waldron.*

70. WENHOLZ, H., and J. M. PITT. **A maize-growing contest. Manning River district.** *Agric. Gaz. New South Wales* 32: 705-712. 1921.—Corn samples sent in by farmers to a central agency under official auspices were planted and grown side by side on selected farms. This method eliminates the faults of the ordinary individual acre-yield contest, where but 1 variety is grown on any 1 farm. Nearly all yields were high, the maximum being 139 bushels per acre.—*L. R. Waldron.*

71. WHITE, ORLAND E. [Rev. of: HARSHBERGER, JOHN W. **Pastoral and agricultural botany.** xiii + 294 p., illus. P. Blakiston's Son & Co.: Philadelphia, 1920.] *Torreyia* 21: 88-90. 1921.—This book, intended as a text-book of agricultural botany for colleges, appeals to a very limited class of students. One-third of the volume is devoted to stock-poisoning plants. Other chapters are devoted to feeds and feeding, economic grasses, weeds, seed-selection, and the economic value of the pea family. No attention is given to plant-breeding, physiology, and plant-diseases. [See also *Bot. Absts.* 7, Entry 33.]—*J. C. Nelson.*

72. WHITTET, J. N. **Grass and clover plots at Orange.** *Agric. Gaz. New South Wales* 32: 498. 1921.—Notes are given on *Phalaris bulbosa*, *Festuca arundinacea*, Ladino clover (*Trifolium repens* var.), and *Melilotus alba*.—*L. R. Waldron.*

73. WIGGINS, M. B. **Increase yield by planting disease-free seed.** *Potato Mag.* 45: 9. 1921.—The author tells of an average increase of 39 per cent on 64 farms in Butler County, Pennsylvania.—*Donald Folsom.*

BIBLIOGRAPHY, BIOGRAPHY, AND HISTORY

C. W. DODGE, *Editor*

(See also in this issue Entries 469, 533, 626, 634, 784, 786, 834)

74. ANONYMOUS. Mr. John Harrison, F. L. S. Gard. Chron. 69: 146. 1921.—This is a brief biographical sketch with portrait.—*P. L. Ricker.*

75. ANONYMOUS. Robert Allen Rolfe. Biographical sketch. Gard. Chron. 69: 204. 1921.—A Kew botanist and Victoria and Veitch medalist, specializing on orchids, and founder and editor of the *Orchid Review*, died April 13, 1921.—*P. L. Ricker.*

76. ARTHUR, J. C. [Rev. of: HEDRICK, U. P., Editor. *Sturtevant's notes on edible plants*. Rept. New York Agric. Exp. Sta. [Geneva] 1919: i-vii, 1-686. *Portrait*. 1919 (see Bot. Absts. 8, Entry 862).] Science 54: 437-438. 1921.

77. BATHER, F. A., and "J. A. H." Scientific publication. Nature 108: 144-145. 1921.—This comprises 2 replies to Brierley (see following entry). Bather recommends editorial suppression of unnecessary material rather than other means. The 2nd writer believes the solution will be found in a single publication for each branch of science in each country.—*O. A. Stevens.*

78. BRIERLEY, W. B. Scientific publication. Nature 108: 41-42. 1921.—Three alternatives in overcoming the cost of scientific publications are: (1) Have the author pay the expense; (2) reorganize societies and group publications; (3) radically change the format of scientific journals. The 1st is extremely undesirable, the 2nd seems to the writer the obvious solution, but few agree. The last and perhaps most feasible plan would be to publish in the journals very full summaries without more details or data than necessary, detailed reports being filed in some national depository. Important articles might be mimeographed or photographed, or the originals loaned to responsible investigators.—*O. A. Stevens.*

79. BROTHERSTON, R. P. J. C. Loudon and "The Gardeners' Magazine." Gard. Chron. 69: 246. 1921.—This is a biographical sketch with notes on the various publications in which Loudon was interested.—*P. L. Ricker.*

80. COBURN, LOUISE H. The Josselyn Botanical Society of Maine. Maine Naturalist 1: 18-21. 1921.—This is a sketch of the activities of this society since its organization in 1895.—*Neil E. Stevens.*

81. CUBONI, G. La lotta contro la Peronospora: Oggie e . . . quarant'anni fa. [The fight against grape mildew: Today and forty years ago.] Boll. Mens. R. Staz. Patol. Veg. 1: 35-40. 1920.—This historical sketch of the important advances made in Italy and elsewhere in the control of grape downy mildew, *Peronospora viticola*, is by one of the few living scientists in Italy who had personal knowledge of the 1st appearance of the disease in Italy over 40 years ago.—*D. Reddick.*

82. EBERLE, F. G. Clair Albert Dye. Jour. Amer. Pharm. Assoc. 10: 727-728. *Portrait*. 1921.—This is a sketch of the life of Clair Albert Dye, professor of materia medica and dean of the Ohio University College of Pharmacy. He received the degree of doctor of philosophy at the University of Bern, having studied under the direction of Tschirch. In addition to being a successful teacher, he was interested in the national development of his profession, having served on many important committees.—*Anton Hogstad, Jr.*

83. KANTROWITZ, HUGO. Heinrich Zörnig. Jour. Amer. Pharm. Assoc. 10: 83. *Portrait*. 1921.—This is a review of the life of Heinrich Zörnig who devoted much time to

research in the anatomy of medicinal plants, crude drugs and drug powders, drug plant culture, drug geography, etc. He also contributed largely to the question of prerequisites and studies for pharmacists.—*Anton Hogstad, Jr.*

84. LIGNIÈRES, H. DE. *Le tricentenaire de la naissance de Jean de la Fontaine.* [The tercentenary of the birth of Jean de la Fontaine.] *Rev. Eaux et Forêts* 59: 233-238, 280-284. 1921.—On July 8, 1921, the tercentenary of the birth of Jean de la Fontaine was celebrated at Chateau-Thierry. For 20 years la Fontaine was a special officer in the Administration of Waters and Forests.—*S. T. Dana.*

85. MEAD, CHARLES W. *Indian corn or maize.* *Nat. Hist.*, 21: 408-413. 4 illus. 1921.—Maize, found in early Peruvian graves, was widely though primitively cultivated among the aborigines. Irrigation was practised in Peru. Recipes from PARKER, ARTHUR C. *New York State Mus. Bull.* 144 are quoted extensively. Peruvians also made a beer from maize.—*C. W. Dodge.*

86. MURRILL, W. A. *Edward T. Harper.* *Mycologia* 13: 264-265. 1921.—Born at Sabula, Iowa, Sept. 28, 1857; Oberlin College, 1881; Chicago Theological Seminary, 1887; Ph.D. in Semitics, Leipzig, 1891; D.D. Iowa College, 1902, and Oberlin, 1908; chair of Semitics and Comparative Religion at Chicago Theological Seminary, 1892-1911; upon retirement devoted himself largely to studying fleshy fungi, his collections of which are deposited in the Field Museum at Chicago.—*C. W. Dodge.*

87. MURRILL, W. A. *John Macoun.* *Mycologia* 13: 264. 1921.—Born near Belfast, Ireland, 1841, Macoun emigrated to Canada in 1850 and became attached to the Geological and Natural History Survey of Canada. He died at Sidney, British Columbia, July 18, 1920.—*C. W. Dodge.*

88. PARCHMANN. *Die "sparsame Bauweise" als Mittel gegen den Holzangel in Mecklenburg in achtzehnten Jahrhundert.* [The "economic building-plan" as a means of combating the wood shortage in Mecklenburg in the 18th century.] *Zeitschr. Forst- u. Jagdw.* 51: 549-552. 1919.—This is a brief account of legislation enacted during the 18th century regulating the use of wood for building purposes. The first ordinance, April 29, 1706, prepared for an ever-increasing wood shortage, especially of hardwoods. The ordinance of April 18, 1774, provided for supervision of building and repair work. Affidavits were required stating that the lumber was to be used for a definite purpose, and a year later that the lumber had been thus used. On Feb. 8, 1802, Herzog Frederic Frans legislated a new building plan because of the shortage of oak. Where clay was abundant houses were to be built of it, but in regions with abundant softwood stands and little clay only softwood could be used for building, except for the outermost sill.—*J. Roesser.*

89. PEGRAM, W. H., R. U. WILSON, and A. H. PATTERSON. *James Jacob Wolfe.* *Jour. Elisha Mitchell Sci. Soc.* 36: 110-114. *Portrait.* 1921.—A committee of the North Carolina Academy of Science here publishes a short sketch of the life of Dr. Wolfe (died June 9, 1920), with appreciations by E. W. GUDGER, W. C. COKER, and BERT CUNNINGHAM. A bibliography of Dr. Wolfe's writings, prepared by W. C. Coker, is appended.—*W. C. Coker.*

90. SALMON, C. E. *John Wright Curtis (1814-1864) and his herbarium.* *Gard. Chron.* 69: 150. 1921.—The author gives a list of Curtis' plants collected in the vicinity of Alton, England, obtained from H. T. Mennell of Craydon, with brief biographical notes from the present Dr. William Curtis of Alton showing relationship to William Curtis, author of *Flora Londinensis*, 1777-87.—*P. L. Ricker.*

91. SAUNDERS, A. P. *Charles Willis Ward, 1856-1920.* *Bull. Peony News* 13. 29-34. 1920.—This notice of Mr. Ward's death includes an account of the founding of the American Peony Society, brought about largely through his efforts.—*A. P. Saunders.*

92. STEECE, HENRY M. *Corn culture among the Indians of the Southwest*. Nat. Hist. 21: 414-424. 13 illus. 1921.—This is a review of early references to corn among the Indians of the Southwest [U. S. A.]. Water was secured by impounding the flood water, allowing it to penetrate the soil, followed by irrigation where possible. Planting was very deep and it is suggested that this is related to peculiarities of the seedling structure. There was little cultivation after planting except where irrigation was practiced. The ears were husked and stored and the stalks fed to horses during the winter.—C. W. Dodge.

93. TRAVERSO, G. B. Giuseppe Cuboni. Boll. Mens. R. Staz. Patol. Veg. 1: 133-154. 2 portraits. 1920 [1921].—Cuboni was born in Modena, Feb. 2, 1852, and died at Rome, Nov. 3, 1920. In 1870 he entered the medical school at Rome, where he studied botany under De Notaris. He received his doctorate in 1877 and was at once appointed to an assistantship in the botanic garden. In 1881 he went to the royal school of viticulture at Conegliano, first as professor of natural science (1881-85), later as professor of botany and vegetable pathology. In 1887 he returned to Rome as director of the royal station of vegetable pathology, remaining there until his death. He was a member of many scientific societies and academies, including the most coveted Reale Accademia dei Lincei. A bibliography of over 200 titles is appended. Most of the papers deal with Italian mycology or plant pathology, especially with diseases of the grape.—D. Reddick.

94. TRAVERSO, G. B. Un po' di storia della organizzazione del servizio fitopatologico in Italia. [A brief account of the organization of the phytopathological service in Italy.] Boll. Mens. R. Staz. Patol. Veg. 1: 7-16, 42-49, 59-76, 98-100, 108-126. 1920.—A brief résumé of the salient facts leading to the establishment of a phytopathological service in Italy is followed by an account of the establishment of the cryptogamic laboratory at Pavia (1871), the international congress at Lausanne (1877), the Phylloxera convention of Bern (1881), the Italian commission for defense against Phylloxera (1879), the establishment of the station for vegetable pathology at Rome (1887), the establishment of the phytopathological stations at Turin and at Casale (1905), the convention of Turin (1911), the new commission (1911), and the international convention of Rome (1905). A list of the 22 regional stations in Italy is included. The text of the Bern and Rome conventions is reproduced as also the text of the Italian legal enactments for the control of Phylloxera and plant diseases.—D. Reddick.

95. VIEHOVER, ARNO. In memoriam. Ernst Schmidt. Jour. Amer. Pharm. Assoc. 10: 965-966. Portrait. 1921.—Ernst Schmidt, termed by the author "past master of pharmaceutical research," was director of the Pharmaco-Chemical Institute at Marburg for more than 25 years.—Anton Hogstad, Jr.

96. WHEELER, EVERETT P. George Hollis. Bull. Peony News 10. 1-5. 1920.—Biographical note.—A. P. Saunders.

97. WILSON, H. W. Cooperative indexing of periodical literature. Nature 108: 43. 1921.—The H. W. Wilson Company is doing on a commercial basis what the publications mentioned in Nature [see Bot. Absts. 10, Entry 415] are doing on a "co-operative" basis. Librarians say that indexes are used in libraries more than digests and abstracts. The author asks why corporations engaged in educational work should not be recognized as "cooperating" and they as well as the librarians invited to furnish suggestions.—O. A. Stevens.

BOTANICAL EDUCATION

C. STUART GAGER, *Editor*ARTHUR H. GRAVES, *Assistant Editor*

(See also in this issue Entries 71, 170, 212, 230, 466.)

98. ANONYMOUS. *Proceedings of the Association of Economic Biologists.* Ann. Appl. Biol. 6: 314-348. 1920.—This report is devoted largely to papers presented at a symposium on The Integration of Mycological Research with Practice in Agriculture, Horticulture, and Forestry.—*J. G. Leach.*

99. ANONYMOUS. [Rev. of: HARSHBERGER, J. W. *Text-book of pastoral and agricultural botany for the study of injurious and useful plants of country and farm.* xiii + 294 p. P. Blakiston's Son & Co.: Philadelphia; Methuen & Co.: London, 1920.] Sci. Prog. [London] 16: 333-334. 1921.

100. ANONYMOUS. [Rev. of: STONE, HERBERT. *A guide to the identification of our more useful timbers, being a manual for the use of students of forestry.* viii + 52 p., 3 pl., $8\frac{1}{2} \times 5$ in. University Press: Cambridge, 1920.] Jour. Quekett Microsc. Club 14: 171. 1920.

101. ANONYMOUS. [Rev. of: STORM, A. V., and K. C. DAVIS. *How to teach agriculture: A book of methods in this subject.* vii + 434 p. J. B. Lippincott Co.: London, 1921.] Sci. Prog. [London] 16: 334. 1921.

102. ADLAM, G. H. J. *Reform of science teaching in America.* School Sci. Rev. 2: 327-332. 1921.

103. B., W. J. [Rev. of: WEBSTER, A. D. *London trees.* xii + 218 p., 32 pl. The Swarthmore Press: London, 1920.] Nature 108: 142. 1921.

104. CLUTE, WILLARD N. *Plant names and their meanings—IX. Leguminosae I.* Amer. Bot. 27: 129-134. 1921.

105. GROVES, J. *Collecting aquatic plants.* Jour. Botany 59: 300. 1921.—The author refers to W. H. Pearsall's article [see Bot. Absts. 11, Entry 109] and states that all herbarium specimens of water-plants will be better and "at least reminiscent of the beauties of the growing plants" if "floated out."—*S. H. Burnham.*

106. LOWERY, H. *The place of practical work in science teaching.* School Sci. Rev. 3: 26-28. 1921.

107. MILLER, S. E. *Is it heartsease?* Gleanings from Bee Culture 49: 628-629. Fig. 1. 1921.—The honey plant *Polygonum Persicaria* is called heartsease from a spot on each leaf, formerly believed to be a "sign" for the disease for which it was a remedy.—*J. H. Lovell.*

108. OLIVE, G. W. *Careers for boys—agriculture.* School Sci. Rev. 2: 319-322. 1921.—The author stresses the point that boys entering agriculture as a life career should be well and practically educated. Boys should not be taken from school prematurely because agriculture is their life work. Between 12 and 18 the future farmer should spend most of his holiday time on the farm, and no boy should start farming for himself until he has had 2 or 3 years of practice farming after leaving school or college.—*Ellen Eddy Shaw.*

109. PEARSALL, W. H. *On collecting linear-leaved aquatics.* Jour. Botany 59: 260-261. 1921.—Notes are given on dredging, floating-out, and drying water plants.—*S. H. Burnham.*

110. PINGRIFF, G. N. **Science for all—some criticisms.** *School Sci. Rev.* 2: 323-326. 1921.—The author believes that "Science for All," as advocated in an article by Archer Vassall [see Bot. Absts. 11, Entry 112] which he characterizes as a miscellany of odds and ends, gives neither sound elementary knowledge of basic science nor provides an effective scheme of work for boys in secondary schools. Science teaching is part of the birthright of every boy. Without it his outlook on the modern world is one-sided. In his work the writer has used physics and chemistry as subjects of interest, with weekly semi-popular lectures in nature study.—*Ellen Eddy Shaw.*

111. T[ANSLEY], A. G. **Recent text-books of botany.** [Rev. of: (1) FRITCH, F. E., and E. J. SALISBURY. *An introduction to the structure and reproduction of plants.* viii + 458 p., 2 pl., 230 fig. G. Bell and Sons: London, 1920 (see Bot. Absts. 9, Entries 98, 674; 10, Entry 32). (2) JONES, W. NEILSON, and M. C. RAYNER. *A text-book of plant biology.* viii + 262 p., 6 pl., 36 fig. Methuen and Co.: London, 1920 (see Bot. Absts. 9, Entries 675, 681). (3) SMALL, J. *A text-book of botany for medical and pharmaceutical students.* x + 681 p., 1350 fig. J. A. Churchill: London, 1921.] *New Phytol.* 20: 132-136. 1921.

112. VASSALL, ARCHER. **Some aspects of science and education.** *School Sci. Rev.* 2: 241-254. 1921.—In order to have nature study count in preparatory schools, it should appear as a subject for entrance and for scholarship examination. Some limit the function of science to training for inductive reasoning, a view too narrowing. But add to this the value from the application of such knowledge, and the value to the imaginative faculty and aesthetic taste, and the field is broadened. The author speaks of the value of science to the ordinary citizen, the sharpening of his appreciative and critical faculties. Science courses should be based on local environment with an intensive study of 1 exact science and general work in the other sciences. The suggestion is made that a certificate be given in science, thus making this subject not a by-subject but an essential one in elementary and secondary schools.—*Ellen Eddy Shaw.*

CYTOLOGY

GILBERT M. SMITH, *Editor*

GEO. S. BRYAN, *Assistant Editor*

(See also in this issue Entries 248, 275, 317, 318, 322, 323, 361, 439, 490, 730, 866.)

113. BAEHR, V. B. DE. **La spermatogenèse et l'ovogenèse chez le *Saccocirrus major*, suivies d'une discussion générale sur le mécanisme de la réduction chromatique.** [Spermatogenesis and oogenesis in *Saccocirrus major*, with a general discussion of the mechanism of chromatic reduction.] *La Cellule* 30: 381-457. 2 pl. 1920.—This is an account of chromosome behavior in the maturation stages in the marine annelid *Saccocirrus major*. In the spermatogonia, which float in groups in the coelom, there are 18 chromosomes. In the spermatocyte the leptotène threads, which do not form a continuous spireme, conjugate parasynaptically, giving rise to 9 pachytène loops. The synaptic mates are closely associated, but do not actually fuse. The chromosomes now pass through a "metabolic stage" in which the irregular outlines of the chromosomes strongly suggest the changes seen in the growth period of the oocyte. The chromosomes again condense and the synaptic mates become interlaced (strepsitène stage). As they shorten further the synaptic mates split, giving the tetrads seen at diakinesis. The shapes of the chromosomes make it possible to demonstrate without question that the 1st division is reductional and the 2nd equational. In the spermatid the mitochondria form 3 globular bodies which later mass about the extending axial filament; eventually they become resolved into granules and disappear. There are also 3 smaller nucleolus-like bodies present near the nucleus.—The behavior of the chromosomes in the oogenesis is essentially the same as in the spermatogenesis up to the pachytène stage, when the growth period begins. During this period the oocyte and its nucleus enlarge greatly and

the chromosomes become diffused and no longer distinguishable. The chromosomes later reappear as compact double structures, each surrounded by a mass of homogeneous karyoplasmic material. As the nuclear membrane disappears the chromosomes, now in the form of tetrads, become closely grouped, and their karyoplasmic envelopes fuse to form 1 mass. This mass, with the tetrads in it, moves to the periphery of the oocyte where it becomes the achromatic figure. The tetrads separate reductionally at the 1st mitosis and equationally at the 2nd. In fertilization a single spermatozoon enters the very young oocyte in the ovary at about the beginning of the growth period, but lies unchanged in the cytoplasm until growth is completed. After the 2nd maturation mitosis the sperm head transforms into the male pronucleus which fuses with the female pronucleus while the egg is still in the ovary. After the fertilized egg passes into the coelom the fusion nucleus decreases in size and its membrane disappears, leaving the chromatin as a mass of thin granular filaments. About these filamentous chromosomes the achromatic figure develops and segmentation proceeds.—In an extensive general discussion the various opinions on the mechanism of reduction are classified and criticized in the light of the author's results. The interpretation upheld is that involving a parasynapsis of leptotène threads representing entire chromosomes which separate in the 1st mitosis and divide equationally in the 2nd. Objections to this interpretation based on parthenogenetic phenomena are rendered invalid by the condition in *Aphis palmas* [see following entry]. The author agrees with Janssens that the synaptic mates interchange substances, but Janssens's theory that the 2 maturation divisions result in a tetramorphism of the sexual cells is regarded as untenable. The fact that in *Aphis saliceti* (de Baehr 1909) there are 5 somatic chromosomes which at synapsis form 2 gemini and 1 unpaired element showing no doubleness rules out the contention of Meves and others that the gemini are simply masses of chromatin with no individual continuity which split as in a somatic prophase.—L. W. Sharp.

114. BAEHR, V. B. DE. *Recherches sur la maturation des oeufs parthénogénétiques dans l'Aphis palmas*. [Researches on the maturation of the parthenogenetic eggs of *Aphis palmas*.] *La Cellule* 30: 315-353. 1 pl. 1920.—The oogonial mitoses show 8 chromosomes. In the oocyte the independent leptotène threads undergo parasynapsis, forming pachytène threads which thicken and contract into the 4 gemini observed at diakinesis. That the synaptic pairing is homologous is indicated by the fact that the gemini are not of equal size, 2 being small, 1 intermediate, and 1 large. Instead of being distributed by a reductional mitosis the components of the 4 gemini become dissociated within the nucleus; the 8 single chromosomes then elongate slightly and split longitudinally. It is not until this late stage that the changes characteristic of the growth period ensue. The cell and nucleus enlarge markedly, the chromosomes become pale and less compact, and a large deeply staining nucleolus appears. As the nucleus moves to the periphery of the cell and decreases in size the chromosomes resume their compact form. The single maturation mitosis now distributes the halves of the 8 equationally split chromosomes, 8 chromosomes thus passing to the single polar body and 8 remaining to reorganize the egg nucleus. The diploid egg then develops parthenogenetically.—The fact that parthenogenetic eggs form only 1 polar body and remain diploid while sexual eggs form 2 and are haploid led Weismann and others to believe that the 2nd mitosis is reductional in normal maturation. Against this view are urged several objections: (1) The bulk of recent work on normal maturation has shown the 1st mitosis to be reductional; (2) in the bee the egg produces 2 polar bodies whether it develops parthenogenetically or after fertilization; (3) in *Bacillus rossii* (orthopteran) there are 2 divisions, but the egg remains diploid.—The presence of the leptotène-zygotène-pachytène stages in the maturation prophase of parthenogenetic eggs retaining the diploid chromosome number has been taken by some authors to mean that these stages have no significance with regard to reduction. That such a view is untenable is shown by the phenomena reported for *Aphis palmas*. Here the leptotène-zygotène process results in the formation of bivalent chromosomes by parasynapsis as usual, but in the parthenogenetic egg the achromatic mechanism for the distribution of the synaptic mates to daughter cells is absent. The synaptic mates separate ("deconjugate"), and then split longitudinally just as they would had they been distributed as usual, and it is

along the line of this split that the chromosomes divide in the single mitosis which occurs. From these facts it is evident that it is the 1st maturation mitosis that is lacking. After the "deconjugation" of the synaptic mates the cell is really a secondary oocyte so far as chromatin is concerned; the changes of the belated growth period occur in interkinesis and the single mitosis corresponds to the 2nd of normal maturation. The phenomena in *Aphis palmarum* are in complete accord with the theory that reduction is normally accomplished by a parasynapsis of leptotene threads which separate at the 1st mitosis and split longitudinally at the 2nd. The presence of the prophase characteristic of reduction in parthenogenetic eggs which remain diploid is to be interpreted as a "phyletic reminiscence," and indicates the derivation of parthenogenesis from the usual type of sexual reproduction. A series of steps in the transition from the former to the latter condition can be recognized both in parthenogenetic insects and in apogamous plants.—In *Aphis saliceti* (de Baehr, 1908-1912) the male has 5 chromosomes and the female 6. In the male those secondary spermatocytes receiving 2 chromosomes degenerate, while the others, which have 3 chromosomes, all of the mitochondria, and most of the cytoplasm, divide and give rise to spermatozoa. All fertilized eggs develop into females. The female produces parthenogenetic eggs of 2 kinds, with 5 and 6 chromosomes respectively; the former develop into males and the latter into females. The chromosome difference in the eggs is due to some special behavior on the part of the chromosomes at the time the single polar body is formed, but the precise nature of the process is not yet known.—L. W. Sharp.

115. BAMBACIONI, VALERIA. Sulle structure fibrillari del Némec. [On the fibrillar structures of Némec.] Atti R. Accad. Lincei Roma Rendiconti Cl. Sci. Fis. Mat. e. Nat. 29: 62-65. 1920.—A study of root tips of *Cicer arietinum*, *Allium cepa*, *Hyacinthus orientalis*, *Iris germanica*, and *Aspidium aculeatum* leads to the conclusion that the protoplasmic strands present in the cells of the root tips in most of these plants do not present the complex structure described by Némec, but are due to elongated vacuoles. In *Aspidium aculeatum* some structures were observed comparable with some of the fibrils of Némec. These were determined by elongate and sinuous chondriosomes to which it did not appear possible to attribute the physiological significance given by Némec.—F. M. Blodgett.

116. ENDERLEIN, GÜNTHER. Über die geschlechtliche Fortpflanzung der Bakterien. [Concerning sexual reproduction of bacteria.] Beih. Bot. Centralbl. 38: 53-72. Pl. 1. 1921.—In the cholera germ *Microspira comma*, the evidence of sex consists of: (1) The formation of sex cells (gonites) as Mychomerit (haploid cell) with amychomer (haploid nucleus); (2) the differentiation of these gonites into male (Spermit) and female (Oit) cells; (3) difference in the structure of these cells; (4) different reaction of the male cell to an undifferentiated cell (Phytit) and to a female cell; (5) beginning of fusion of sex cells observed in living material; (6) ability of cells developed by this fusion to develop normal material.—The sex cells develop in *Microspira comma* at 37°C. in 5-7 hours in peptone water. The male cell consists of a large head, a middle piece, and a flagellum. In the female cell the nucleus (mychomer) presses against the side to form a knob. The cilium seems poorly developed from the middle of the knob. The movement of the egg is usually obscure; when distinct, it is slow.—The sudden death of colonies heretofore attributed to various causes is due to the development of sex cells in a pure culture where sexual fusion can not take place.—L. Pace.

117. GUILLIERMOND, A. La constitution morphologique du cytoplasme dans la cellule végétale. [The morphological composition of the cytoplasm of the plant cell.] Rev. Gén. Sci. Pures et Appl. 32: 133-140. Fig. 1-4. 1921.—The author traces the origin of vacuoles to mitochondria-like primordia, and ascribes to leucoplasts, chloroplasts, and plastids bearing carotin and xanthophyll an origin in mitochondria-like primordia. Small bodies indistinguishable from mitochondria are spoken of as inactive mitochondria.—In epidermal leaf cells of *Iris germanica* vacuoles are traced to primordia which are elongated, rod-shaped structures somewhat larger than similarly shaped mitochondria. Vacuole primordia stain readily by all in vitro stains, whereas other mitochondria stain with certain of these dyes only,

such as Janus green and Dahlia (le vert Janus et le violet de Dahlia). In sections treated by mitochondrial methods the primordia of vacuoles are not preserved. In fixation they are transformed into smaller vacuoles which do not stain but in which colored granules are sometimes seen. The mitochondria (chondriome) on the contrary are perfectly preserved and are stained densely, the rest of the cytoplasm staining only faintly. The primordia of vacuoles enlarge by hydration, anastomose, forming a network which finally fuses into the typical large vacuole of the mature cell. During its entire development the vacuolar system continues to take up *in vitro* stains, although coloration is less dense owing to greater dilution of the stain in the cell sap. This substance presents the histo-chemical character of phenol compounds. The author asserts that in the majority of phanerogams the difference between primordia of vacuoles and other mitochondria is much less marked, the former containing phenol compounds or anthocyanic pigments. In addition to primordia of vacuoles 2 other kinds of granular or rod-shaped bodies are recognized, namely, plastids concerned with the elaboration of starch, chlorophyll, and the pigments of carotin and xanthophyll, and small granules which remain inactive. It is held that inactive mitochondria of plant cells and plastids containing chlorophyll, etc., as well as the mitochondria of fungi, are exactly homologous with the mitochondria of animal cells,—i.e., all such bodies are regarded as being chemically and morphologically alike.—The data presented and the conclusions drawn are about the same as have appeared in other contributions by the author.—*D. M. Mottier*.

118. GUILLIERMOND, A. Observations cytologiques sur le cytoplasme d'un *Saprolegnia*. [Cytological observations on the cytoplasm of a *Saprolegnia*.] *La Cellule* 30: 357-378. 2 pl. 1920.—In living hyphae of *Saprolegnia* the chondriome (mitochondrial complex of the cell) consists of numerous chondriokonts which vary in length but normally undergo no conspicuous change as the other cell elements differentiate. They may become vesicular or otherwise altered by artificial conditions. They are not concerned in the elaboration of glycogen, which appears independently in the cytoplasm. In the cytoplasm small granules which turn brown with osmic acid and which Dangeard called microsomes represent fatty reserve substances and are clearly distinct from mitochondria. The vacuole system begins as small vacuoles or more often as canaliculi which swell, anastomose, and finally run together to form the large central canal of the hypha. At all stages there is present in the sap a dissolved substance which takes vital stains. Granules seen in the sap at certain stages seem to be mainly alterations of this dissolved substance under the influence of stains. They are abundant in zoosporangia and zoospores, but disappear during germination.—In hyphae fixed and stained by mitochondrial methods the mitochondria are clearly differentiated, and may show various artificial appearances due to the reagents. They are peculiar in being unusually resistant to acetic acid and alcohol. The fatty granulations are also clearly seen. The vacuole system does not show well, but Meyer's formalin-methylene blue-sulphuric acid method shows clearly that the substance present in the vacuole in the dissolved or the granular state is not metachromatin, as Dangeard supposed.—Dangeard has held that the chondriome of other authors is merely a stage in the development of the vacuolar system,—that the vacuoles take their origin from minute metachromatin-containing bodies which swell, pass through stages interpreted by others as mitochondria developing into plastids, and finally join to form the vacuole system. Observations on living and treated cells here reported demonstrate the absolute independence of chondriome and vacuole system, and show that Dangeard has confused these. The chondriome is as distinct in *Saprolegnia* as in other organisms, and probably has an elaborative rôle. The author denies the metachromatic nature of the vacuolar substance and granulations, but now agrees with Dangeard that such granulations originate independently in the vacuole, not from mitochondria, as formerly supposed.—*L. W. Sharp*.

119. MOTTIER, DAVID M. On certain plastids, with special reference to the protein bodies of *Zea*, *Ricinus*, and *Conopholis*. *Ann. Botany* 35: 349-364. Pl. 15. 1921.—In the species studied the protein granules owe their origin to plastids the primordia of which are permanent organs of the cell. These primordia are very small, densely staining granules or rods generally referred to as mitochondria, chondriosomes, etc. In *Zea* as these bodies elabor-

ate proteins they increase in size, but it is uncertain whether 2 or more fuse. In *Ricinus* the primordia aggregate in vacuole-like cavities and their products unite to form large aleurone grains. There are also present in *Ricinus* leucoplastid-like bodies which may be concerned in oil synthesis. The protein bodies in the parasite *Conopholis* arise from primordia in the same manner as in *Zea*.—*W. P. Thompson*.

120. SHARP, LESTER W. *Spermatogenesis in Blasia*. Bot. Gaz. 69: 258-268. Pl. 1920.—Centrosomes are present in *Blasia* at all stages of the mitosis which differentiates the androcytes, and in the androcytes they persist and function as blepharoplasts. In the transformation of the androcyte into the spermatozoid, the blepharoplast fragments repeatedly by simple fission, forming a number of distinct granules which coalesce to form a short lumpy rod. This rod elongates, becoming a more uniform thread bearing 2 cilia, while the nucleus also elongates in intimate union with it to form the body of the spermatozoid. The present instance is the 1st in which blepharoplast fragmentation has been reported in a bryophyte. Possibly the fission of the *Blasia* blepharoplast, and therefore the more complex fragmentation of the blepharoplasts of *Equisetum*, *Marsilia*, and the cycads, may be homologized with the normal division exhibited by ordinary centrosomes.—*L. W. Sharp*.

121. SHOWALTER, A. M. The chromosomes of *Conocephalum conicum*. Science 53: 333. 1921.—Study of the chromosomes of male and female thalli shows no recognizable difference between the sexes. The chromosome number is 9 instead of 8, as reported by previous workers.—*A. M. Showalter*.

ECOLOGY AND PLANT GEOGRAPHY

H. C. COWLES, *Editor*

GEORGE D. FULLER, *Assistant Editor*

(See also in this issue Entries 31, 168, 176, 197, 200, 206, 207, 233, 342, 443, 448, 449, 451, 454, 456, 459, 460, 462, 463, 465, 468, 475, 489, 551, 653, 729, 802, 849, 850, 851, 856, 864, 870, 872, 886)

GENERAL, FACTORS, MEASUREMENTS

122. BULLER, A. H. R. The red squirrel of North America as a mycophagist. Trans. British Mycol. Soc. 6: 355-362. 1920.—The red squirrel not only habitually feeds on mushrooms during the growing season but often collects them in great numbers for its winter food supply. These it stores in holes in tree trunks or in other similar places, and sometimes separately on the branches of trees.—*W. B. McDougall*.

123. BURKE, E., and R. M. PINCKNEY. A further report on Montana climate. Montana Agric. Exp. Sta. Circ. 87. 15 p. 1919.—In Montana the 1919 growing season was the third consecutive one with light precipitation, and was not only the driest of the 3, but also the hottest and driest of which there is any record. The scarcity of moisture has probably never been felt more keenly than in this year; having affected irrigation, city water supplies, and especially dry land farming. The purpose of this circular is to present sufficient data to give the public an idea of the amount of precipitation. Stations having fairly complete records, and so located as to be representative of the state as a whole, furnished the data.—*H. E. Morris*.

124. FOWERAKER, C. F. Australasian vegetation. [Rev. of: (1) BETTS, M. W. Notes on the autecology of certain plants of the peridotite belt, Nelson. Trans. New Zealand Inst. 50: 230-243. 1917. (2) COCKAYNE, L. Notes on New Zealand floristic botany. Trans. New Zealand Inst. 49: 56-65. 1917.] Jour. Ecol. 8: 155-157. 1920.

125. POOL, R. J., J. E. WEAVER, and F. C. JEAN. Further studies in the ecotone between prairie and woodland. *Univ. Nebraska Studies* 18: 1-47. 17 fig. 1918.—A quantitative experimental study was made in eastern Nebraska, stations being selected at Peru on the Missouri River, and at Lincoln, 60 miles west. In spite of the short distance separating these stations, striking contrasts were found, due to both climatic and edaphic factors. The prairies and woodlands near Lincoln are much more xerophytic than those near Peru. During the summer of 1917 the available soil moisture was exhausted on 18 different days on a Lincoln prairie and on only 4 different days on a comparable Peru prairie. Many mesophytic woodland species pass out in traversing the area between these 2 localities. The high saturation deficit and the low soil moisture content of the prairie sites in eastern Nebraska constitute barriers over which forest trees can scarcely pass. The authors feel that herein is the most ready explanation for the confinement of Nebraska woodlands to the moist slopes of narrow valleys and for the general treelessness of prairies. In the order of increasing mesophytism, the forests about Peru are as follows: Bur oak-yellow oak, black oak-hickory, red oak, linden-ironwood, while the common forest type about Lincoln is that of the bur oak-hickory.—*H. C. Cowles*.

126. WEISS, H. B., and E. WEST. Fungus insects and their hosts. *Proc. Biol. Soc. Washington* [D. C.] 33: 1-20. 1920.—A partial list is given of the various fungus hosts of certain insects. The fungi listed belong in the main to the families Polyporaceae and Agaricaceae, while the insects mentioned are almost entirely Coleoptera.—[See also *Bot. Absts.* 9, entry 371.]—*J. C. Gilman*.

127. WHITFORD, H. N., and R. D. CRAIG. Forests of British Columbia. *Rept. Comm. Conserv. Canada Committee on Forests*. 409 p., 28 pl., 21 maps. Ottawa, 1918.—Though this volume deals mostly with technical material, there is much of ecological interest, especially in the chapters on climatic and soil relations (pp. 48-79) and on forest trees (pp. 187-219). There are numerous photographic reproductions of forest types and individual trees, and maps showing the distribution of forest types and 9 of the chief component species. [See also *Bot. Absts.* 3, Entry 968.]—*H. C. Cowles*.

STRUCTURE AND BEHAVIOR

128. CANNON, W. A. [Rev. of: WEAVER, J. E. The ecological relation of roots. *Carnegie Inst. Washington Publ.* 286. 128 p. 1919 (see *Bot. Absts.* 8, Entry 97).] *Science* 51: 393. 1920.

129. LOWE, H. J. Bees and the scarlet runner bean. *Nature* 105: 742. 1920.—Humblebees are reported as gnawing through the calyx and stamen filaments to reach the nectaries.—*O. A. Stevens*.

130. McMURPHY, J., and G. J. PEIRCE. Drought and the root system of *Eucalyptus*. *Science* 51: 119. 1920.—In the fall of 1913 the *Eucalyptus* in the arboretum of Stanford University was evidently dying. As a result of investigation, 2 conclusions were arrived at: (1) That the method of keeping down weeds by tillage with deep plowing had broken off large superficial roots and had injured others, and that absorption of water from the upper layers of the soil had been seriously impaired; (2) that although *Eucalyptus* is generally considered a bad neighbor and that other nearby plants suffer for lack of water, the neighboring ground can be utilized by selecting those plants which have a deeper absorbing system than the *Eucalyptus*.—*A. H. Chivers*.

131. STONEY, EDITH A. The carrying power of spores and plant life in deep caves. *Nature* 105: 740-741. 1920.—In the Rübeland caves in the Harz mountains, "vegetation" was observed to be affected much more by electric lights than by oil lamps. Zeleny and McKean found that while a cloud of minute smooth paraffin spheres or mercury droplets obeyed Stoke's

law, similar experiments with spores of *Lycopodon*, *Polytrichum*, and *Lycopodium* gave only about $\frac{1}{2}$ the theoretical terminal velocity. The author considers that this is due to a coating of long hairs which greatly resists transportation by air currents.—O. A. Stevens.

132. TANSLEY, A. G. Ecology of roots. [Rev. of: WEAVER, J. B. Ecological relations of roots. Carnegie Inst. Washington Publ. 286. 128 p., 33 pl., 58 fig. 1919 (see Bot. Absts. 8, Entry 97).] Jour. Ecol. 8: 150-154. 1920.—Many of the results are collected and displayed in a tabular form facilitating comparisons.—Geo. D. Fuller.

133. UPHOF, J. C. TH. Physiological anatomy of xerophytic Selaginellas. New Phytol. 19: 101-131. Fig. 1-12. 1920.—Six per cent of the known species of *Selaginella* are xerophytic and may be divided into 3 groups. "1. Plants with vertical leaves, of the same shape and size. The apex of each leaf ends in a long awn containing no chloroplasts. The anatomical construction is sclerotic. 2. Plants having slender, wiry, trailing stems, spreading over the ground or hanging from rocks and sometimes trees. 3. Plants having a spreading habit, stems often forming a flat, dense and close rosette, rolling into a cluster-ball during drought." —The anatomical and ecological relations of the 3 groups are considered; the shape, size, and construction of the leaves; the anatomy of the stems; behavior under natural conditions and in the greenhouse; the presence and function of a considerable amount of oil, which replaces the starch of the hydrophytic species.—I. F. Lewis.

134. ZOPETTI, LUIGI. L'abito fogliare nelle siepe di Ligustro. [The habit of leaf production in a privet hedge (*Ligustrum*).] Atti R. Accad. Sci. Torino 55: 131-138. Fig. 1. 1919-1920.—All plants of *Ligustrum* are heterophyllous, not merely those cultivated in hedges. The leaves of the hedge are better adapted to winter. Reduction in dimensions of branches and leaves of hedge plants may be due either to late development of buds or to the development of adventitious buds.—Harriet M. Libby.

VEGETATION

135. BOULENGER, A. Sur les *Primula elatior*, *acaulis*, et *officinalis*, à propos de la note de M. Ad. Davy de Virville. [Concerning *Primula elatior*, *acaulis*, and *officinalis* in connection with the note of Ad. Davy de Virville.] Compt. Rend. Acad. Sci. Paris 170: 1297-1300. 1920.—The 3 species are found growing on different types of soil: *P. elatior* on very damp soil; *P. acaulis* on dry soil; and *P. officinalis* on calcareous soil. *P. acaulis* and *P. elatior* cross readily, *P. acaulis* and *P. officinalis* rarely. The paper discusses the possibility of *P. elatior* being a hybrid of the other 2 species.—C. H. Farr.

136. FLEISCHER, M. [Rev. of: TIMM, R. Die Moos besiedelung unserer Steindeiche. [The colonization of our stone-dikes by mosses.] Verhandl. Naturw. Ver. Hamburg III. 24: 1-36. 20 fig. 1916.] Hedwigia 60: (Beiblatt) 37-38. 1918.—The reviewer adds *Dichodontium pellucidum* to the list of mosses given by the author, and compares the rapid colonization of the German stone-dikes by mosses with the rapid appearance of vegetation on the volcanic island of Krakatau in the East Indies.—A. W. Evans.

137. FOWERAKER, C. E. Australasian vegetation. Jour. Ecol. 8: 155-156. 1920.—This is a review of several minor papers on the botany of southern Australia.—G. D. Fuller.

138. MORTON, GERTRUDE P. Shore vegetation of Flathead Lake, Montana. Plant World 22: 355-362. 2 fig. 1919.—The shore successions at Flathead Lake are of both xerophytic and hydrophytic types. Either succession leads to the same climax forest, except where moisture is lacking for climax development; then, prairie replaces forest. The xerophytic successions are the rock shore succession and stony beach succession. The hydrophytic successions are the swamp meadow and the delta swamp. Lists of plants found in each of these successions are given.—Charles A. Shull.

139. TANSLEY, A. G. **The classification of vegetation and the concept of development.** Jour. Ecol. 8: 118-149. 1920.—This is a discussion of the classification of vegetation which tends to clarify some obscure points. The author insists that it is absolutely necessary to fix attention on the units of vegetation as they actually occur in nature and not to attempt to classify vegetation either by life forms or by habitat. The natural units of vegetation to be employed in any system of classification must, in the first instance, be determined empirically. These units are essentially topographical ones and they are to be grouped according to development. While differing in many ways from true organisms, they may most conveniently and most correctly be regarded as quasi-organisms. In this respect the author takes what appears to be a stand midway between such extreme views as those of Clements, who regards vegetational units as true organisms, and those of Gleason, who refuses to consider a unit of vegetation as an organic entity. The plant "association" is regarded as the primary and fundamental unit of vegetation. In this Tansley is in agreement with a majority of ecological investigators although he lays great stress upon the limitation of the terms to mature units in relatively stable equilibrium with their environment. Transitory plant communities are differentiated from fully developed ones and are termed "associes." For parts of associations and associes dominated by a single species it is suggested that Clement's usage be followed by designating them respectively as "consociations" and "consocieties." The continued use of "formation" is recommended. The formation must be determined empirically and it consists of a set of plant communities related developmentally and culminating in 1 or more associations. It is regarded as possible to distinguish climatic and physiographic (edaphic) formations although not so sharply as has been done by Nichols because of the frequent replacement of climatic by physiographic factors, which is gradual in the transition region between 2 climatic regions. It is recommended that plant associations be named by their dominant species, and the formations, when possible, from the form of the vegetation.—*Geo. D. Fuller.*

140. WARMING, EUG., und P. GRAEBNER. **Eug. Warming's Lehrbuch der ökologischen Pflanzengeographie; dritte umgearbeitete Auflage.** [Eug. Warming's textbook of ecological plant geography; third revised edition.] 762 p. Gebrüder Borntraeger: Berlin, 1918.—As noted in the preface, this edition of Warming's well-known work follows the general lines of the English edition of 1909, and is radically different from the preceding German editions, to which the author contributed no new material. This volume is much larger than those that have preceded, and the literature is brought to date, so far as possible. The chief new material, as compared with the English edition, is in the chapters on life forms and on symbiosis. In the latter chapter is a full discussion of associations and formations, the author following the recommendations of the Brussels Congress of 1910.—*H. C. Cowles.*

FLORISTICS

141. ANONYMOUS. **Flora of the Hawaiian Islands.** [Rev. of: CAMPBELL, D. H. The derivation of the flora of Hawaii. Leland Stanford Junior Univ. Publ. Univ. Ser. 34 p. 1919 (see Bot. Absts. 3, Entry 1608).] Nature 105: 217. 1920.

142. BRADSHAW, R. V. **Wild flowers of the Oregon coast.** Amer. Bot. 26: 84-87. 1920.

143. CHODAT, R., et W. VISCHER. **La végétation du Paraguay. VIII. Apocynaceae.** [The plant life of Paraguay. VIII. Apocynaceae.] Bull. Soc. Bot. Genève 11: 211-225. 9 fig. 1919.—The Paraguayan plants of Apocynaceae rarely have the appearance of European species of *Vinca*. *Lochnera rosea* resembles a *Vinca* in appearance but is not the most typical plant. The family is represented by many and various forms, including herbs, lianas, shrubs, and trees. *Aspidosperma* is found isolated or in groups in the xerophytic forests of north and central Paraguay. The common white Quebracho with its spine-like leaves has the habit of a Ginkgo. *Tabernaemontana* and *Forsteronia* with a bushy or subarborescent development are the 2 most abundant, and the principal types represented. A description of *Macrosiphonia virens* Müll. argov. var. *Missionum* Chod., n. var., is included in this section.—*W. H. Emig.*

144. CHODAT, R., et W. VISCHER. *La végétation du Paraguay. IX. Urticaceae.* [The plant life of Paraguay. IX. Urticaceae.] Bull. Soc. Bot. Genève 11: 226-258. 16 fig. 1919.—*Urtica urens*, *Boehmeria ramiflora*, and *B. cylindrica* are so widely distributed that they influence the characteristic appearance of Paraguayan vegetation. In or near the forests *Parietaria debilis* is associated with *Elephantopus scaber*. In certain places the plants of *Parietaria* are surrounded by the short tufts of the grass *Oplismenus setanus*, while in other parts *Pilea hyalina* is especially common. In the more central forests are species of *Urtica* growing 2-4 m. high supported by lianas or tree trunks. *Urera caracasana* can be easily differentiated from *U. baccifera*, which has glabrous leaves, hooked spines, and is almost equally common. A form of *Urera baccifera*, growing in partial forest shade, with enormous cordate leaves and branches 40 cm. in length might better be called *U. grandiflora* Parodi. It is difficult to explain the presence of the xerophytic structures of *Sorocea sylvicola* which occur in the shaded areas of the forests. *S. sylvicola* is the most characteristic plant of the underbrush and oftentimes the only abundant plant. Its membranous leaves are sometimes rich in epiphytes,—lichens of the genus *Strigula*, fungi of the genus *Asterina*, and certain hepatics. In the humid forests interesting observations were made on the first stages in the germination of saprophytic *Ficus* plants; the mycelium of a mycorrhizal fungus accompanies the delicate roots. The plants described in this section include: *Ficus (Urostigma) guaranitica* Chod., *F. horquetensis* Chod., *Sorocea sylvicola* Chod., *S. sylvicola* var. *coaguezuensis* Chod., and *Dorstenia brasiliensis* Lam. var. *guaranitica* Chod.—W. H. Emig.

145. CHODAT, R., et W. VISCHER. *La végétation du Paraguay. X. Aroideae.* [The plant life of Paraguay. X. Aroideae.] Bull. Soc. Bot. Genève 11: 259-299. 27 fig. 1919.—Species of *Philodendron* and some of the most beautiful plants of the neighboring forests are cultivated in the villages. Three new species of *Philodendron*, similar to *P. undulatum* but very distinct in habit and morphology, were observed: *P. dubium* Chod. & Vischer, occurring on sandy riverbanks or bogs of lagoons; *P. petraeum* C. & V., comprising a series of forms more or less xerophytic and inhabiting cliffs of central Paraguay, with 3 described varieties,—*P. petraeum* C. & V. var. *tobatiense* C. & V., *triangulare* C. & V., and *vulenzuelae* C. & V.; *P. pygmaeum* C. & V., appearing like a small plant of *P. undulatum* growing on humus. *P. undulatum* is typical of Paraguay and occurs in the shallow water of the lower levels in the ancient forests. No plants of the last mentioned species were observed growing as epiphytes. *P. Sellowii* C. Koch is terrestrial and arborescent; in the borders of humid forests it appears in all stages of tree-like growth and in all degrees of epiphytism. The most remarkable aroid of Paraguay is *Taccarum Hasslerianum* Chod., in which the connectives of the synandrium are surmounted by a globular cushion. This is the only aroid that occurs on the sandy lands of the Paraguayan campos.—W. H. Emig.

146. CLUTE, WILLARD N. Notes on the Navajo region. Amer. Bot. 26: 29-47. 1920.—A description of the country is given with notes on the water supply and prevailing vegetation.—S. P. Nichols.

147. COBURN, LOUISE H. *Marsilea quadrifolia* in Maine. Rhodora 22: 156. 1920.—The occurrence of a colony of this species on the surface of the pond in the public park in Skowhegan, Maine is noted. According to M. L. Fernald this is the 2nd record of the genus in Maine.—James P. Poole.

148. DEAM, CHAS. C. Plants new to Indiana. VIII. Proc. Indiana Acad. Sci. 1918: 144-150. 1920.—The article consists of a list of 43 species distributed among 34 genera, with habitat, locality, date, and herbarium number.—F. C. Anderson.

149. FLEISCHER, M. [Rev. of: GYÖRFFY, J. Beiträge zur Moosflora des Balaton- (Platten-) Sees und seiner Umgebung. I. (Contributions to the moss flora of Balaton Lake and vicinity.) Magyar Bot. Lapok 15: 235-242. 1 pl. 1916.] Hedwigia 60: (Beiblatt) 34. 1918.—The reviewer calls attention to the interesting features of the Balaton Lake region of Hun-

gary from a geological standpoint and shows that the geographical distribution of *Fontinalis hypnoides*, one of the species discussed, is far more extensive than the author indicates.—A. W. Evans.

150. GIBBS, L. S. Notes on the phytogeography and flora of the mountain summit plateaux of Tasmania. Jour. Ecol. 8: 1-17, 89-117. 1920.—The report begins with a sketch of the portion of the geological history of the island that most directly concerns its present vegetation. The present area of 27,000 square miles seem to have been much reduced during the latest glacial period subsequent to its separation from Australia, now 184 miles distant. Its vegetation during that period consisted probably of mosses and low shrubs only. As its present configuration comes from the dissection of one huge plateau there are within the island no important barriers to migration and the elevations do not exceed 5,000 feet. The annual rainfall varies from 112 to 165 inches while high winds are incessant upon the more elevated portions. The *Eucalyptus* forests of the lowlands, the mixed forest of the west coast, and the vegetation of the tablelands and mountains constitute the 3 main plant formations of the island. These formations with their main subdivisions are briefly characterized but only the higher elevations are considered in detail. Their vegetation is regarded as austral-montane rather than alpine. The higher plateaus range from 3,500 to 4,000 feet in altitude, with a few rock masses higher. There are no glaciers or permanent snow fields although during the winter months the mountains are often snow covered and this, together with heavy rains during the rest of the year and persistently high winds, constitutes a fairly rigorous climate which results in a vegetation that is shrubby and spreading in habit with small coriaceous leaves and almost wholly without herbaceous forms except on the highest peaks where the snow remains late in the season. There a mosaic of low moss-like plants is developed, the individuals often taking the form of cushions. Shrub associations dominate the more exposed plateau summits. Here the vegetation reaches a height of 1-1½ m. and is decidedly xerophytic in aspect, showing rigid branching, small evergreen leaves, and often terminal flower clusters. These shrub associations vary from a very scattered display upon broken rock to dense masses with a well developed undergrowth where soil conditions are more favorable. Usually there is no massing of a single species, several mingling freely. In one situation the endemic *Microcachrys* formed a dense green carpet for yards around well isolated groups of various shrubs. At somewhat lower altitudes the shrubs pass into the dwarf montane forest, one type of which consisted of trees like *Phyllocladus asplenifolius*, *Arthrotaxis selaginoides*, *A. laxifolia*, and *Atherosperma* crowded together with various shrubs that are about 2 m. in height. The conditions of low temperature, intense illumination with high winds and heavy rainfall, here limited to high altitudes, in the Antarctic regions are found at sea-level and result in similar vegetation; hence it is not inappropriate to apply the term "antarctic" to this montane flora. The practical absence of annual leaf-fall and the entire absence of leguminous plants which act as nitrifying agents are regarded as responsible for the lack of progressive improvement of soil conditions and the persistence of xerophytes. The same factors account for the relative absence of herbaceous plants. In seeking for the origin of this flora after an examination of the available evidence, Miss Gibbs concludes that "the mountains of New Guinea may be considered as the focus of development and distribution of the so-called 'antarctic' plants, justifying the term Papuan austral-montane for this group, of which, even on the limited basis of our present knowledge, nearly one-half of its most characteristic genera are now known from New Guinea." She also contends that the northwesterly poleward wind which sweeps persistently over the mountains of New Guinea above tree level, in a constant direction and at a constant altitude, decreasing in height in its progress southward, is the agency by which this flora has been transported. Once established the elements remain within the radius of the lower but equally constant circumpolar wind. Collections from these montane associations show 108 species of vascular plants, of which 67 are endemic, the most remarkable family being the Coniferae with 7 genera and 9 species, 3 genera and 8 species being endemic. Other large families are the Proteaceae with 8 species, all endemic, the Myrtaceae with 5 species, 3 being endemic, the Epacridaceae with 20 species, of which 16 are endemic, and the Compositae with 19 species, 12 being endemic.

Among families well represented in boreal montane regions but much less conspicuous in Tasmania are the Cyperaceae, Ranunculaceae, Cruciferae, Rosaceae, and Ericaceae, each possessing but a single species.—*Geo. D. Fuller.*

151. HARPER, ROLAND M. A week in eastern Texas. Bull. Torrey Bot. Club 47: 289-317. Fig. 1-5. 1920.—A week's travel in eastern Texas served to show contrasts between different portions of the state and between Texas and states to the east which have much the same temperature and rainfall. Eastern Texas seems to be poorly provided with shade-loving spring flowers, *Sphagnum*, ferns, and many other plants named in the article.—*P. A. Munz.*

152. HAYEK, A. VON. Zur Kenntnis der Flora des Berges Zlep bei Ipek. [Toward a knowledge of the flora of the mountain Zlep near Ipek.] Ann. Naturhist. Hofmus. Wien 31: 65-76. Pl. 1. 1917.—This is a sparsely annotated list of plants collected by A. Penther in northern Albania. One species, *Aconitum Pentheri*, is described as new.—*A. S. Hitchcock.*

153. HURST, CECIL P. East Wiltshire bryophytes. Jour. Botany 58: 141-147. 1920.—A list is given with notes on distribution of 60 species and 14 varieties of mosses, and 24 species and 1 variety of hepatics. Twenty-nine mosses are listed as found in fruit though ordinarily producing fruit but rarely. The bryophytes studied were found growing around Great Bedwyn near Marlborough, East Wiltshire, in 1918 and 1919. The locality is one noted for its rare and interesting plants, a fact for which the diversity of the soils is probably responsible. The sandy-clay strata of the Reading Sands furnish a particularly large number of interesting plants. Several especially interesting mosses are discussed.—*K. M. Wiegand.*

154. MERRILL, DUDLEY. Lichens of the Mt. Monadnock region, N. H.—No. 12. Bryologist 23: 78. 1920.—Ten species are listed without data.—*E. B. Chamberlain.*

155. NELSON, AVEN. Flora of the Navajo Reservation. Amer. Bot. 26: 48-56, 87-89. 1920.—A classified list is given of plants collected by W. N. Clute in 1919.—*S. P. Nichols.*

156. NELSON, JAMES CARLTON. Plants of Boone County, Kentucky. Proc. Indiana Acad. Sci. 1918: 125-143. [1920.—The author made the collection during the years 1881-1893. No attempt was made to determine ferns, grasses, and sedges; however, 4 pteridophytes are listed in addition to 1 juniper and 514 species of angiosperms, which are distributed among 316 genera and 90 families. An additional list of 37 species collected near Hanover, Indiana, but not found in Boone County, Kentucky, is given.—*F. C. Anderson.*

157. PALMER, ERNEST J. The ligneous flora of the Staked Plains of Texas. Jour. Arnold Arboretum. 2: 90-105. 1920.—The geology and physiography of the Staked Plains are discussed. The region is described as a high mesa-like tableland nearly destitute of running streams, with sparse rainfall and exposed to dry winds of high velocity during the greater part of the year. The flora is essentially grassy, and ligneous plants are almost entirely absent. The woody plants are restricted to the deep canyons cut into the plateau chiefly near its southern rim. The flora of these canyons is of comparatively recent origin and its composition is very heterogeneous showing that it is derived from many sources; wind and migratory birds are probably the principal agents in introducing plants into the canyons, a process which apparently is still going on. An annotated list is given of the woody plants collected in the Palocuro Canyon, the largest of these canyons.—*Alfred Rehder.*

158. ROIG, J. F., M. CREMATA, and S. C. BRUNER. Exploración botánica en la Ciénaga de Zapata. [Botanical exploration of the Zapata marsh.] Rev. Agric. Com. y Trab. [Cuba] 3: 213-221. 1 map. 1920.—A month was spent exploring this marsh and the peninsula of the same name. The article includes separate reports by each of the above authors. General accounts of trip, descriptions of the country and names of some of the plants recognized, and a considerable number of common names used locally are reported. Considerable collections of plants, woods, and fungi were made to be determined later.—*F. M. Blodgett.*

159. RYDBERG, P. A. *Phytogeographical notes on the Rocky Mountain region—IX. Wooded formations of the montane zone of the Southern Rockies.* Bull. Torrey Bot. Club 47: 441-454. 1920.—In central Colorado this zone is defined as extending from about 2500 to 3000 m. altitude. The following wooded formations can be distinguished: Pine forest, spruce forest, aspen groves, poplar groves, alder-willow swamps, copses, and sage-brush. Lists of plants characterizing each are given.—*P. A. Munz.*

160. SMALL, J. K. *The land of ferns.* Jour. Elisha Mitchell Sci. Soc. 35: 92-104. *Pl. 24-28.* 1920.—An account is given of the ferns of Florida. Over one hundred species of ferns and their allies are described as growing wild in the state, only 3 of which are naturalized exotics. There are 7 endemic species, 59 tropical, and 32 essentially extra-tropical. Regional distribution is taken up and each ecological area analyzed.—*W. C. Coker.*

161. WILLIS, J. C. *Plant invasions of New Zealand with reference to Lord Howe, Norfolk, and the Kermadec Islands.* Ann. Botany 34: 471-492. 1920.—The age-and-area hypothesis is applied to the flora of islands lying to the north and northwest of New Zealand. Evidence is first presented to show that the flora of New Zealand has probably been derived from 4 invasions,—southern, western, northern, and by way of the Kermadec Islands. The islands studied lie in the paths of the 3 last named invasions. A list is then given of the New Zealand genera showing the invasion by which each reached New Zealand, as deduced from their local distribution in New Zealand. Other lists give the genera of the outlying islands which reach New Zealand and also the endemics of the outlying islands. Twenty-three predictions based on the age-and-area hypothesis are then made concerning the floras of these islands, their relationship to each other and to that of New Zealand. All the predictions are verified by the actual facts. It is also concluded that the flora of New Zealand must have reached that country from Indo-Malaya by land (not by casual transport across the ocean) and that the islands considered formed part of, or lay near to, that land.—*W. P. Thompson.*

APPLIED ECOLOGY

162. SCHWARZ, E. H. L. *The Kalahari and Ovamboland.* Nature 105: 297-299. 3 fig. 1920.—In this flat sandy area of 350,000 square miles west of Victoria Falls (South Africa), the dry condition has been brought about in quite recent times by changes in the river channels; restoring these would make the region again productive. Ovamboland is not suited to white settlement but Kalahari is, and with water grows cotton, maize, and wheat.—*O. A. Stevens.*

163. TANSLEY, A. G. *Plant succession.* [Rev. of: SAMPSON, A. W. *Plant succession in relation to range management.* U. S. Dept. Agric. Bull. 791. 76 p., 26 fig. 1919 (see Bot. Absts. 4, Entry 380).] Jour. Ecol. 8: 154-155. 1920.

164. TANSLEY, A. G. *Climatic regions and crop distribution in the United States.* [Rev. of: WALLER, A. E. *Crop centers of the United States.* Jour. Amer. Soc. Agron. 10: 49-83. 12 fig. 1918 (see Bot. Absts. 1, Entry 2).] Jour. Ecol. 8: 157-158. 1920.

FOREST BOTANY AND FORESTRY

J. S. ILLICK, *Editor*

(See also in this issue Entries 25, 88, 98, 100, 443, 444, 604, 615, 631)

165. ANONYMOUS. *Forestry in Pennsylvania.* Amer. Forest. 27: 459-460. 1 map. 1921.—Papers given at the meeting of the Pennsylvania Forestry Association at Pittsburg, June 16, 17, 1921, are noted.—*Chas. H. Otis.*

166. ANONYMOUS. *Forests and streamflow.* Amer. Forest. 27: 341. 1921.—Editorial.—*Chas. H. Otis.*

167. ANONYMOUS. **Two forestry bills.** Amer. Forest, 27: 403-404, 413. 1921.—Texts of the Snell-McCormick and Capper bills presented to Congress for a national forest policy are given.—*Chas. H. Otis.*

168. ANONYMOUS. **Indian silviculture.** [Rev. of: TROUP, R. S. **The silviculture of Indian trees.** Vol. I. Dilleniaceae to Leguminosae (Papilionaceae). *lviii* + 336 + *iii* p.; Vol. II. Leguminosae (Caesalpineae) to Verbenaceae. *xi* + 337-783 + *iv* p.; Vol. III. Lauraceae to Coniferae. *xii* + 785-1195 p. The Clarendon Press: Oxford, 1921.] *Nature* 103: 3-4. 1921.—This is an historical sketch of publications on the trees of India. The illustrations of the present work are especially commended.—*O. A. Stevens.*

169. ANDERSON, MALCOM P. **A winter journey in northern China.** *Nat. Hist.* 20: 516-531. *Pl. 14.* 1920.—The interest of the botanist centers around photographs which tell the story of the ruin of the soil by centuries of erosion unimpeded by the forests that once covered the mountains.—*Albert R. Sweetser.*

170. AUDERT, C.-G. **Visites de forestiers anglais dans les forêts d'Ecouvies et des Andaines.** [Visits of English foresters to the forests of Ecouvies and Andaines.] *Rev. Eaux et Forêts* 59: 143-148. 1921.—Since 1919 4 parties of English forest students have visited the forests of Ecouvies and Andaines, where the climate is particularly favorable for oak and beech; but the stands, as a result of former heavy cuttings, fires, and other abuses, are broken up and widely varied and in some places Scotch pine, silver fir, and Norway spruce have been planted. Despite the apparent complexity 2 simple systems are used: Coppice and broadleaf high forest, and occasionally conversion into high forest. Forest conditions and management are explained to the students, who are shown the various treatments and participate in whatever operations are under way at the time. The necessity of adapting treatment to climatic conditions and to the particular stand under consideration is emphasized. Thus, in cloudy Normandy clear cutting is successful in securing reproduction of oak since the seedlings (according to Roulleau) maintain themselves in the soil and grow only on the admission of sufficient light. Damages due to the war, *i.e.*, overcutting, failure to secure satisfactory reproduction, and the impossibility of making needed thinnings and other improvements because of lack of funds and labor, are emphasized.—*S. T. Dana.*

171. BILLET. **La protection des forêts particulières en Belgique.** [The protection of private forests in Belgium.] *Rev. Eaux et Forêts* 59: 197-205. 1921.—Of the 520,070 hectares of forest land in Belgium the state owns 7 per cent; communes 32 per cent; public establishments, 2 per cent; and private owners, 59 per cent. The Belgian forest code of 1854, unlike the French, imposes no restrictions on private owners, and this freedom has recently led to such disastrous exploitations as to jeopardize seriously the public interests. By a proposed law the king, on recommendation of a committee of 7 appointed by the Minister of Agriculture, may set aside as "protected forests" privately owned tracts of special public interest because of esthetic, hygienic or hydrologic value. In those protected forests no clearing, clear cutting, or other extraordinary cutting not covered by the working plan or by the usual practice of the owner would be allowed without consent of the Minister of Agriculture except in the case of windfalls and dead trees. Where no working plan exists, the cutting of more than $\frac{1}{4}$ of the total volume in broadleaf or coniferous high forests, or of more than $\frac{1}{2}$ the volume in coppice under standards, would be prohibited without similar authorization. As a compensation the state would protect the forests from trespass and at the owner's request supervise his management without charge. Pending enactment, a provisional law was passed, effective Jan. 28-Nov. 1, 1921, authorizing the Minister of Agriculture to prohibit clear cutting of forests of special public interest except in coniferous stands, where the cut-over area belonging to a single owner must not exceed 25 hectares, and in coppice under standards where the volume of the latter does not exceed 25 cubic m. per hectare. The application of similar provisions in France, where the present forest code does not prohibit clear cutting but only complete clearing, would prevent the present frequent abusive exploitations.—*S. T. Dana.*

172. BODEN. Aus dem Jahresbericht der Forstakademie Eberswalde für die Jahre 1915-1918. [From the annual report of the forest academy of Eberswald for the years 1915-1918.] Zeitschr. Forst- u. Jagdw. 51: 546-549. 1919.—This is a brief summary of the results of the work of securing raw products from the German woods during the war in the academic instruction district of the forest district Freienwald. The subjects considered are fodder-wood and leaf fodder, turpentine and resin, insect damage, and pannage. The individual felling system (Selbsthieb), which proved satisfactory for thinning, is described.—*J. Roesser.*

173. BROWN, N. C. The ancient forest of Camaldoli in Italy. Amer. Forest. 27: 624-628. 9 fig. 1921.

174. BURY, HENRY. The generation of heath fires. Nature 108: 83. 1921.—The author suggests that the fires seen by Martin (see Bot. Absts. 10, Entry 2060) may have spread for some distance beneath the surface. Cutting away the heather is the surest way to prevent fires.—*O. A. Stevens.*

175. CARDOT, E. [Rev. of: GUYOT, CH. Manual de droit forestier. (Manual of forest law.) 340 p. Berger-Levrault: Nancy, Paris, and Strassburg, 1921.] Rev. Eaux et Forêts 59: 177-181. 1921.

176. DENGLE, Forstliches und jagdliches aus Rumanien. [Facts from the forests and the chase in Roumania.] Zeitschr. Forst- u. Jagdw. 51: 584-598. 1919.—The author discusses the forests, forest management and economics, and wild life in 2 Roumanian forest districts between the Carpathians and the Danube. There are 3 forest zones: oak, beech, and spruce. The forms of forest ownership are state, community, corporation, and private; no efforts have been made to consolidate groups of holdings. A form of the selection cutting system is used, all desirable timber being removed and the scrub and undesirable left. Felling methods are extremely crude and destructive; breast high stumps are not uncommon. Hand logging and transportation by chutes and by floating in streams are practiced. The problems facing the Roumanian forest manager are numerous: Separating forest and meadow; assembling, consolidating, and straightening the boundaries of forest holdings; surveying and dividing forests; building roads and trails; developing the cutting system under state management; educating woodsmen in logging technique; and securing a systematic regeneration of forest lands while converting the virgin and selection forest into an even-aged high forest.—*J. Roesser.*

177. DUNLAP, FREDERICK. Growth of oak in the Ozarks. Missouri Agric. Exp. Sta. Res. Bull. 41. 28 p. 1921.—Various measurements of 118 post oaks (*Quercus minor* [Marsh.] Sargent), 114 black oaks (*Q. velutina* Lam.), 54 black jack oaks (*Q. marylandica* Muenchh.), and white oaks (*Q. alba* L.), at Mideo in the Ozark section of Missouri, are reported. Black oak grew more rapidly than white oak during the 1st century, and both grew much more rapidly than post oak or black jack oak. Tables and graphs showing the rate of growth and the relation of age, height, and volume to diameter for each species are included. The accuracy of the method used in computing the volumes was checked by comparing the cordage computed from measurements with the yield actually obtained on 4 1-acre plots. The average error was about 3 per cent.—*L. J. Stadler.*

178. FRANZ. Kontrollbuch, Hauptmerkbuch II, Betriebsplan und das damit Zusammenhängende bei der preussischen Staatsforstverwaltung. [Control book, chief memorandum book II, scheme of management and related subjects in the Prussian state forest administration.] Zeitschr. Forst- u. Jagdw. 51: 572-583. 1919.—The factors which make the new control book system too theoretical are: Methods of regulating the cut and the differentiation between principal and intermediate yield, etc. It ignores the periodic fluctuation in the yield from any district; and the work entailed is too complicated for practical use. The author outlines a simplified loose-leaf system (illustrated) which strives to systematize and

secure uniformity of labor as far as possible, clarify the work of development and mode of treatment of each stand, abolish unessentials, and create a simple but comprehensive supervision of the management by reducing all book-work to a minimum.—*J. Roesser.*

179. FRÖMBLING. *Wie die Lüneburger Heide ward und schwindet.* [How the Lüneburger heath originated and is disappearing.] *Zeitschr. Forst- u. Jagdw.* 51: 675-683. 1919.—The Lüneburger heath region was a magnificent forest of beech and oak. The soil was sandy, and poor in minerals but rich in humus, furnishing ideal conditions for beech and ash reproduction. The forest was not superseded by culture, the present steppe being the result of mismanagement and abuse. The agricultural land was gradually replaced by heather, with resultant soil deterioration. Pine came in on the "new soil" and the present forest is almost pure pine. Small areas of broadleaf forest were spared, no large openings in the crown-cover being made and the humus and soil moisture thus conserved. Whether the hardwood forest can be restored is difficult to foretell. The present soil dryness and the presence of hardpan would seem to preclude the possibility.—*J. Roesser.*

180. FROTHINGHAM, E. H. *Forest experiment station for the South.* *Amer. Forest.* 27: 598-599. 1921. [Read before the Southern Forestry Congress at Atlanta, July 22, 1921.]

181. GRAVES, H. S. *A new menace to forestry.* *Amer. Forest.* 27: 645-647. 1921.—This is an article on the proposed reorganization of the United States Forest Service.—*Chas. H. Otis.*

182. GUIE, H. D. *Washington's forest catastrophe.* *Amer. Forest.* 27: 379-382. 5 fig. 1921.—The author recounts the felling of 8 billion feet of virgin timber by a tornado which swept the Olympic Peninsula Jan. 29, 1920. The path of the storm, which devastated 2,200 square miles of territory in western Clallam and Jefferson Counties, was over 70 miles long and 30 miles wide.—*Chas. H. Otis.*

183. HAYES, W. E. *Reforestation in the middle states.* *Amer. Forest.* 27: 376-378. 5 fig. 1921.—This article is concerned with the outlook in Ohio, Indiana, and Illinois.—*Chas. H. Otis.*

184. HICKEL, R. [Rev. of: UNWIN, A. HAROLD. *West African forests and forestry.* 527 p., pl. T. Fisher Unwin: London, 1920.] *Rev. Eaux et Forêts* 59: 149-151. 1921.

185. HOFFMAN, M. *Sozialisierung und Forstwirtschaft.* [Socialization and forest management.] *Zeitschr. Forst- u. Jagdw.* 51: 513-523. 1919.—A comparison of the forest industry with any other shows that the work of wood cutters and laborers is a very minor factor in the net yields of forestry. The relation of the value of labor to the total revenue from the cutting and manufacture of wood is so fundamentally different from that existing between production costs and selling price in industrially manufactured products that the business of forestry can not be compared with other industries. The question whether it is advisable to convert large private forests into state holdings may be answered to the extent that the idea of common ownership is not strengthened thereby, and the present state supervision guarantees practically all that socialization strives to produce. At present, too, the states can not buy forests. To increase production on private holdings the forming of forest associations is suggested, with a regular management plan carried out under the supervision of technical officers.—*J. Roesser.*

186. HUFFEL, G. *Le mouvement forestier à l'étranger.* [Forestry abroad.] [Rev. of: (1) FANKHAUSER, F. *Guide pratique de sylviculture.* (Practical guide to silviculture.) Translated by M. Petitmerle. 348 p., 121 fig. Payot: Geneva, Switzerland, 1921. (2) POSKIN. *Sylviculture et agriculture.* (Silviculture and agriculture.) *Ann. Gembloux* Feb., 1921.] *Rev. Eaux et Forêts* 59: 174-176. 1921.—This, the 3rd French edition of

Fankhauser's guide, first published in German in 1866, is a well illustrated, elementary, encyclopedic summary of information needed by forest officers. It covers the importance and general usefulness of forests, silviculture proper, forest technology, forest protection, and forest engineering.—S. T. Dana.

187. HUTCHINSON, W. Pony blimps for fighting forest fires. Amer. Forest. 27: 618-619. 2 fig. 1921.

188. ILLICK, J. S. The hard pines of the Northeast. Amer. Forest. 27: 487-496. 18 fig. 1921.—The author describes the range, characteristics, and habits of *Pinus divaricata*, *P. resinosa*, *P. rigida*, *P. virginiana*, and *P. pungens*.—Chas. H. Otis.

189. ILLICK, J. S. The pines of the South. Amer. Forest. 27: 552-559, 574. 16 fig. 1921.—The author discusses the occurrence, characteristics, silvics, and wood of *Pinus palustris*, *P. echinata*, *P. taeda*, *P. heterophylla*, *P. serotina*, *P. glabra*, and *P. clausa*.—Chas. H. Otis.

190. ILLICK, J. S. The white pine. [*Pinus Strobus*]. Amer. Forest. 27: 422-426. 10 fig. 1921.

191. MARC, P. Un cantonnement partiel des droits d'usage dans la forêt domaniale de Dabo. [A partial nullification of the rights of user in the State forest of Dabo.] Rev. Eaux Forêts 59: 206-212. 1921.—The State forest of Dabo was for centuries heavily burdened by rights of user, but in 1864 the rights enjoyed by the residents of Abrechwiller and Voyer were abrogated. In the case of the former, 2,450 hectares of state forest, estimated annual value 28,720 francs, were freed of all rights of user, 515.4 hectares being set aside as communal forest. This forest has enabled the town to give every inhabitant annually 5-7 cubic m. (stacked) of firewood, and in addition yielded on the basis of pre-war prices an annual cash revenue of 30,000-40,000 francs.—S. T. Dana.

192. MAXWELL, HU. The uses of wood. Wood in games and sports. Amer. Forest. 27: 431-438, 444. 20 fig. 1921.

193. MÜLLER. [Rev. of: KUBELKA, AUGUST. Moderne Forstwirtschaft. (Modern forest management.) 190 p. F. Deuticke: Wien and Leipzig, 1918.] Zeitschr. Forst- u. Jagdw. 51: 503-506. 1919.—Kubelka states that the extensive clear-cutting system, with subsequent planting of spruce is unsuccessful and can not be reconciled with the highest qualitative and quantitative yield. He advocates the strip selection system (Femelstreifenbetriebs). Stands selected for regeneration are to be made receptive for reproduction by a preparation felling extending over the entire area. The areas are then logged in definitely marked strips 30-50 m. wide. Reproduction is secured by cutting openings not exceeding in diameter the average height of the stand and distributed in about every 4th strip. Möller does not agree as to the practicability of this method, and in conclusion states that this work adds nothing to Chr. Wagner's Grundlagen der Räumlichen Ordnung im Walde (1918), the theories of which he urges all foresters to put into early practice, since they are considered the most practical yet proposed to supersede the present order.—J. Roesser.

194. MÖLLER. [Rev. of: WEBER, HEINRICH. Grundlinien einer neuen Forstwirtschaftsphilosophie. (The fundamentals of a new philosophy of forest management.) 116 p. H. Laupp: Tübingen, 1919.] Zeitschr. Forst- u. Jagdw. 51: 617-621. 1919.

195. MÜLLER. Forstliche Mitteilungen aus dem preussischen Solling. [Forest information from Prussian Solling.] Zeitschr. Forst- u. Jagdw. 51: 534-545. 1919.—A discussion of the artificial regeneration of beech and the introduction of other species in mixture in natural beech reproduction in the Prussian Solling. The planting of nursery-grown beech 3-4 m. in height (Buchenheister) is no longer justified because of cost. For the present, planting

transplants or small trees to supplement natural regeneration is necessary in many places to insure continued production of valuable hardwood timber. Trees 3-6 years old under shelter-wood are recommended. On very favorable sites, expensive methods to secure new stands of beech are justified. Other species which make desirable mixtures, including several North American, are described at length. The chief drawback to the mixture of Norway spruce and beech, generally used in the Bunter sand-stone region, has been and is the wide variance in the rotation ages of the 2 species. Single spruce trees in dense beech reproduction make a desirable mixture. Following the beech reproduction cutting, 400 trees are planted per hectare to insure 100 mature trees.—*J. Roesser.*

196. MÜLLER. *Forstliche Mitteilungen aus dem preussischen Solling.* [Forest information from Prussian Solling.] *Zeitschr. Forst- u. Jagdw.* 51: 604-613. 1919.—As a rule, good oak reproduction, though more easily secured than beech, is to be expected only from good seed years, which occur only occasionally and at elevations below 400 m.; above this elevation early frosts usually hinder ripening of seed. All results on bunter-sandstone soils favor extensive "wide-seed cuttings" (*Breitsamenschläge*) for securing and fostering reproduction. In this method preparation fellings must be made at the right time preceding a good seed year; at the same time a heavy stand of weeds is secured which protects the seedlings from frost and from destruction by game. Oak seedlings survive even under severe suppression by weeds. Final cuttings are not to be made until the reproduction is 2 years old and has a density of 2 plants per cubic m. The stand is thinned by cleanings before crown development is seriously impaired and trunk sprouting initiated. Since most thinning must now be done by day labor, the stuff is removed by pollarding, i.e., the trees are cut off at approximately 6 feet from the ground. The stubs offer protection in dense stands against browsing by deer, and upon sprouting furnish side shade which keeps down trunk sprouts on trees left in the stand.—*J. Roesser.*

197. MÜLLER, H. *Litauische Kiefern-Fichten-Mischbeständen.* [The mixed pine-Norway spruce forests of Lithuania.] *Zeitschr. Forst- u. Jagdw.* 51: 470-480. 1919.—The author believes that the vertical arrangement (*Gliederung*) or composition of the soil is more important than its elevation, the latter considered by Schwappach the chief factor determining the representation and relations of these stands in mixture. The relation of various classes of soils to composition and mixture is discussed, as is also the effect of various forms of spruce-pine mixtures on the conditions of management.—*J. Roesser.*

198. PACK, A. N. *Philanthropy or efficiency.* *Amer. Forest.* 27: 642-643, 655. 1 fig., 1 diagram. 1921.—This article is concerned mainly with the operation and management of pulp and paper companies.—*Chas. H. Otis.*

199. PACK, A. N. *Reforestation that will pay dividends.* *Amer. Forest.* 27: 427-430, 6 fig. 1921.

200. PARDÉ, L. *Les principales essences exotiques dans l'arboretum national des Barres de 1900 à 1920.* [The principal species of exotics in the national arboretum at Barres from 1900 to 1920.] *Rev. Eaux et Forêts* 59: 134-138, 166-173. 1921.—Since 1900 accurate records have been kept on a considerable number of exotic tree species, largely American, planted at Barres. The results with the more important of these, including 31 hardwoods and 41 conifers, presented here show that, while certain foreign species on which exaggerated hopes had been built are absolutely without a future in France (at least under the conditions existing at Barres), others because of their beauty and remarkably rapid growth are of very great interest. Prominent among the latter are incense cedar, bigtree, redwood, Calabrian pine, Corsican pine, Atlas cedar, Nordmann fir, and especially Douglas fir, alpine fir, and grand fir. The results of the experiments, in spite of the indifference to exotics manifested by most foresters, have proved that they are of great importance and unquestionably worth continuing.—*S. T. Dana.*

201. PRATT, GEORGE D. **Forest conservation in New York.** Nat. Hist. 19: 85-103, Pl. 21. 1919.—The author discusses policy and methods in the state preserve in the Catskill and Adirondack mountains and the expenditure of the money raised by a bond issue of \$7,500,000. The fire protection service, the evils of denudation, methods of reforestation, and the fight against parasites are described. The value of the state forest as playground and recreation park is emphasized.—*Albert R. Sweetser.*

202. RECORD, S. J. **Figure in wood.** Amer. Forest. 27: 611-617 17 fig. 1921.

203. REISNER, J. H. **Chinese forestry in 1919-1920.** Amer. Forest. 27: 656-659, 8 fig. 1921.

204. ROGERS, E. C. **Influence of the period of transplanting western white pine seedlings upon their behavior in nursery and plantation.** Jour. Agric. Res. 22: 33-46. 1921.—In Montana, *Pinus monticola* is propagated 1 year in the seed bed and 2 years in the transplant bed. From $\frac{1}{4}$ to $\frac{1}{2}$ of the seedlings transplanted in the autumn are heaved out by the action of frost. Experiments indicate that such stock can be transplanted with greatest safety from a date as early in spring as the ground can be worked until early July. In general the safest practice is to transplant in April or May. The 2 most critical periods for transplanting are midsummer and the period of opening of the buds up to a time when the needle fascicles are 2 mm. in length. Seedlings transplanted at either of these times lagged behind their neighbors in the transplant bed for 2 years but "when planted in the field as 1-2 stock the plants survived as well as the others with little, if any, inferiority in growth."—*D. Reddick.*

205. ROTH, FILIBERT. **The present and prospective in forestry.** Amer. Forest. 27: 547-550, 574. 4 fig. 1921. [From an address delivered at the Pennsylvania State Forestry Association, June 16, 1921.]

206. SALVADOR, G. **La forêt de la Sainte-Baume (Var).** [The forest of Sainte-Baume.] Rev. Eaux et Forêts 59: 161-165. 1 fig. 1921.—The author quotes a letter written in 1912, describing the state forest of Sainte-Baume in Provence. This virgin forest of 138 hectares at the foot of the steep cliff of Saint-Pilon is a relic of quaternary times. Composed of a magnificent stand of beech, basswood, yew, and maple, it is in striking contrast to the general aridity of the mediterranean zone in which it lies. It is said that no other forest in Europe is so rich in yew, 1 stump of which shows nearly 800 rings. The preservation of this isolated patch of northern forest in the midst of southern surroundings is due not only to the altitude (700-900 m.), the northern exposure, and the protection afforded by the cliff of Saint-Pilon, but also to the religious reverence with which the place has always been regarded. No cutting has ever been done. Should its equilibrium now be disturbed, the primitive forest would disappear rapidly and could be restored only at great expense and after a long period, during which the planting of a transition stand of drought-enduring pines would have to be resorted to.—*S. T. Dana.*

207. SCHRÖDER, H. **Aus russischen Forsten.** [From Russian forests.] Zeitschr. Forst- u. Jagdw. 51: 598-604. 1919.—In this study of the relationship of soil and climate to pine growth in a pine district of approximately 5000 hectares in Russia on the eastern boundary of Lithuania, the author describes 9 different soils, the composition and thrift of their respective stands, and concludes that character of soil is not the only factor producing good growth, climate being equally if not more important. The optimum climate for pine includes a relatively high atmospheric dryness and a brief energetic growth period. Conditions are very favorable for reproduction. The soil floor is made up of needle humus and a thin loose layer of moss, which does not interfere with natural regeneration. *Calluna vulgaris* (heather) has not come in to any extent in the old stands. The success of natural reseedling is insured by the abundant soil moisture at the beginning of the vegetative period. Burned areas make especially good seed beds. The thriftiness of pine on deserted farm land is attributed to the

absence of the root disease so common in Germany. Spruce exists only secondary to pine, since it does not find the atmospheric moisture requisite for best development. The management practice is extensive. Transportation facilities are poor, and only a minimum number of old trees are removed. The alternate strip method is used in felling, and regeneration is unaided.—*J. Roeser.*

208. SCHULENBURG, VON DER. *Holzabfuhr durch eigene Gespanne der Forstverwaltung.* [The transport of wood by teams owned by the forest administration.] *Zeitschr. Forst- u. Jagdw.* 51: 685-688. 1919.—The results obtained by various private forest administrations in removing wood with their own equipment having proved satisfactory, the possibility of the state forest department operating with its own equipment is considered.—*J. Roeser.*

209. STERLING, E. A. *Adirondack forest musings.* *Amer. Forest.* 27: 620-623. 5 fig. 1921.—This article is concerned with lumbering activities in the Tupper Lake region.—*Chas. H. Otis.*

210. TRESCKOW, VON. *Einige Gedanken über das Mass staatlichen Eingreifens in die Wirtschaft der Privat- und Gemeindewälder.* [Remarks concerning the degree of state control in the management of private and communal forests.] *Zeitschr. Forst- u. Jagdw.* 51: 524-527. 1919.—In general, the socialization of private forests would constitute the poorest financial undertaking into which the state could venture, though it is necessary for the state to take steps to increase and perpetuate the production of private forests. Better care of forest stands can be secured more easily through societies, associations, and courses of study than by state coercion. A system of forest sections and afforestation districts, under the supervision of afforestation commissioners who would supervise and coordinate the work on private forests within their districts is suggested. Such a system would not, it is believed, add to the burden of the state budget and would not interfere with private initiative.—*J. Roeser.*

211. WELLS, S. D. *Book paper from southern woods.* *Sci. Amer. Monthly* 3: 439-441. 3 fig. 1921.—The possibility of using pines and other conifers to furnish a perpetual supply of pulp is considered.—*Chas. H. Otis.*

GENETICS

GEORGE H. SHULL, *Editor*

JAMES P. KELLY, *Assistant Editor*

(See also in this issue Entries 10, 22, 46, 54, 56, 67, 113, 114, 121, 135, 377, 400, 412, 423, 439, 440, 453, 457, 521, 540, 556, 563, 594, 630, 811, 866)

212. ANONYMOUS. *Carriers of the germ plasm.* *Jour. Heredity* 10: 422. Fig. 21. 1919.—A set of 3 photomicrographs is given, showing the egg and spermatozoon about to unite, the penetration of the sperm, and cleavage of zygote into 2 cells, in the white rat. The descriptive matter points out how identical twins arise by the separation of the 2 cells in the 1st cleavage, and their development as distinct individuals. The photographs were taken by Joseph Long of the University of California.—*H. H. Plough.*

213. ANONYMOUS. *Racial differences in mortality.* *Jour. Heredity* 11: 336. 1920.—This article reviews the analysis of census figures by Louis I. Dublin and Gladden W. Baker as reported in the Quarterly Publication of the American Statistical Association, March, 1920, in which significant differences in the mortality of various racial stocks in Pennsylvania are discovered. The authors' conclusions are as follows: (1) Of 3 main groups of white population in New York and Pennsylvania, (a) native born of native parents, (b) native born of foreign or mixed parentage, (c) foreign born, the 1st has the lowest mortality in both sexes

and at practically every age period, though most marked in adults; (2) foreign born and native born of foreign or mixed parentage resemble each other more than native stock, except between ages of 25 to 44, when foreign born have great advantage over native born of foreign or mixed parentage because of predominance of Irish, German, and British stock among 1st generation Americans at this age period; (3) death rates of component groups among foreign born vary, Austro-Hungarians, Russians, and Irish showing excessive death rates, higher even than rates in their own countries (Irish mortality is double that of native stock); (4) findings of previous study for New York state are confirmed. Facts suggest that immigrants to the U. S. A. are not representative of the best in their native countries; (5) similar studies should be made of 1920 census reports.—*E. E. Jones.*

214. ANONYMOUS. **To increase the birth rate.** Jour. Heredity 1: 64. 1921.—The author reviews a discussion by Wilhelm Schallmayer in *Die Umschau* (Nos. 32 and 33, 1919) of changes in taxation and an insurance plan for parents, as methods of increasing Germany's present low birth rate. He condemns an income tax which fails to make any allowance, or inadequate allowance, for children in a family, and approves the proposal that parents shall not be allowed to bequeath their entire estate to children unless there are at least 4. If fewer than 4, each may inherit a portion of the estate, the remainder going to collateral relatives according to size of family; or $\frac{1}{2}$ be allowed the family and $\frac{1}{2}$ go to the state for eugenic purposes.—The author suggests that the cost of offspring be borne by the state through a state parenthood insurance bureau. Stipulated benefits paid at the birth of each child up to limited number would provide a check to keep poor stock from proliferating unduly in order to get bonuses. To discourage the carelessness causing a large percentage of infant mortality, the author would refuse to pay the benefit for a child until after its 1st birthday.—It is urged that steps be taken to keep the racial contribution of each section of population proportionate.—*E. E. Jones.*

215. ANONYMOUS. [German rev. of: SIEMENS, HERMANN WERNER. **Einführung in die allgemeine Konstitutions- und Vererbungs-Pathologie.** (Introduction to the study of general constitutional and hereditary disease.) 229 p., 80 fig. Julius Springer: Berlin, 1921.] *Anat. Anzeig.* 54: 463. 1921.

216. ADAMI, GEORGE. **The true aristocracy.** Sci. Monthly 13: 420-434. 1921.—In this address before the 2nd International Congress of Eugenics, New York, Sept. 22-28, 1921, it is pointed out that in the more primitive societies the outstanding man had the choice of the most comely and capable girl in his group. This led to a hereditary aristocracy. The love of good family, either as something already attained or as something to be attained, is inherent in the human race. In France the size of the "dot" has caused the quality of stock to be subordinated with results no more satisfactory than from the "mate as you please" system of the Anglo-Saxons.—It is claimed that if the tests for physical and mental efficiency worked out during the war could be taken over by the eugenic societies, and the A1 records published, beginning at 18 and repeated at 5-year intervals, a real aristocracy would be established.—*L. Pacc.*

217. ALVERDES, F. [German rev. of: FRITSCH, G. **Die Anthropoiden und die Abstammung des Menschen.** (The anthropoid apes and the origin of man.) Zeitschr. Ethnol. 50: 1-11. 3 pl. 1918.] Zeitschr. Indukt. Abstamm.- u. Vererb. 27: 80. 1921.

218. ALVERDES, F. [German rev. of: SUMNER, FRANCIS B. **Geographic variation and Mendelian inheritance.** Jour. Exp. Zool. 30: 369-402. 7 fig. 1920 (see Bot. Absts. 5, Entry 1670).] Zeitschr. Indukt. Abstamm.- u. Vererb. 27: 79. 1921.

219. ALVERDES, F. [German rev. of: WEBER, E. J. **Experimental studies on the origin of monsters. II. Regarding the morphogenesis of duplicities.** Jour. Exp. Zool. 24: 409-443. 27 fig. 1917 (see Bot. Absts. 1, Entry 1312).] Zeitschr. Indukt. Abstamm.- u. Vererb. 27: 77-78. 1921.

220. ANDERSON, W. S. Progress in horse breeding. Jour. Heredity 12: 134-137. 1 fig. 1921.—The paper discusses from the genetic standpoint the improvement in speed in recent years in the Thoroughbred and in the Standard-bred Trotter.—*Sewall Wright*.

221. BATHER, F. A. Biological terminology. Nature 107: 489-490. 1921.—The writer denies the allegation of Sir Archdall Reid that systematic botany and zoology constitute a purely descriptive science based on definite, concrete facts of structure, in which there is little or nothing based on causes, on antecedents and consequents, or on hypothesis. He also denies that biologists are averse to the employment of crucial tests, but admits that in the manifold processes of life it is not always easy to formulate tests that are really crucial. [See also Bot. Absts. 11, Entries 241, 282, 299, 300, 301, 302.]—*C. B. Hutchison*.

222. BEHR. Die Heredodegeneration der Makula. [Hereditary degeneration of the macula.] Klinische Monatsbl. Augenheilk. 65: 465-505. 1920.—Behr regards degeneration of the macula as a true familial disease except in those cases where some other obvious cause, as a definite infection, can be shown. The appearance of the defect is usually coincident with certain metabolic crises in the individual, such as birth, 2nd dentition, puberty, and senile involution. There are set types of degeneration, including different progressive forms and a stationary form. One type occurs constantly in a given family, another in a different family. Hereditary transmission may be direct or indirect, and in most cases the male carrying the defect is unaffected, while the female carrying the defect has the macular degeneration.—*M. F. Weymann*.

223. BELL, ALEXANDER GRAHAM. Is race suicide possible? Jour. Heredity 11: 339-341. 1920.—The author speaks of the powerful influence exerted on population by "negative selection," and contends that marriage should be held up as an ideal to the best of the race. He considers the effect of race suicide on an isolated population and on a population subjected to competition from foreign races, and concludes that the "spirit of race suicide will itself commit suicide," leaving a more fertile race than before, unless immigrants are admitted during the period of declining birthrate. Therefore, the only hope for a truly American race lies in restricting immigration.—*E. E. Jones*.

224. BERGTOLD, W. H. Mutants. Auk 38: 468. 1921.—This is a brief notice of unusual coloration in specimens of a male English sparrow (*Passer domesticus*), a male house finch (*Carpodacus mexicanus frontalis*), and a white-crowned sparrow (*Zonotrichia leucophrys leucophrys*). The interest lies in the similarity of the markings of the last 2 to those found in related species.—*L. J. Cole*.

225. BLAKESLEE, A. F. A graft-infectious disease of *Datura* resembling a vegetative mutation. Jour. Genetics 11: 17-36. Pl. 2-6. 1921.—A peculiar disease of *Datura Stramonium* causes a number of changes in the normal appearance of the plant and gives rise to what the writer calls the "quercina" type. The quercina, or Q, plants have greater dentation of leaves, slit corollas, no pollen, partially suppressed or no spines on the capsule, and other less striking deviations from the normal. When this type first appeared it was thought to be a somatic mutation, and it seemed to exhibit vegetative segregation. Further work demonstrated that the quercina appearance was due to a disease which spread from infected parts to all new growth. The Q condition was transmitted through the seed, Q × normal plants giving about 79 per cent of Q plants among the progeny. When it appeared in this way it was easily detected among the seedlings. Lightly infected Q plants sometimes produced a little pollen, and it was shown that the disease could be transmitted through the pollen. Quercina scions grafted on to normal plants caused new growth of normals to become Q type, and normal scions developed the disease when grafted on to diseased stocks. It was not found possible to inoculate healthy plants by rubbing with diseased leaves or injecting juices from diseased tissues.—*A. C. Fraser*.

226. BLAKESLEE, ALBERT F., DONALD S. WELCH, and J. LINCOLN CARTLEDGE. **Technique in contrasting Mucors.** Bot. Gaz. 72: 162-172. 2 fig. 1921.—The authors emphasize the importance of a definite special technique to overcome the discordant results which might otherwise appear in studying sexual reactions between different races of Mucors in culture dishes. Since the greatest sources of error lie in foreign infection, extreme precautions must be taken. A suitable culture dish is described, methods are outlined for obtaining and growing the races in pure culture, and the technique of inoculating, examining the cultures, and testing the races by their sexual reactions are discussed.—E. F. Cuba.

227. BLARINGHEM, L. **Autotomie de fleurs provoquée par des mutilations.** [Autotomy of flowers induced by mutilation.] Compt. Rend. Soc. Biol. 85: 440-441. 1921.—Of 25 castrated buds of *Linum grandiflorum*, 11 fell in 4 days, and within 8 days all, even those artificially pollinated, had fallen.—Removal of parts of the corollas of 22 hybrid plants of *Verbascum thapsiforme* and *V. Blattaria* caused corollas to drop immediately, reminding the author of movements in the sensitive plant [*Mimosa*].—J. P. Kelly.

228. BRIDGES, CALVIN B. **Current maps of the location of the mutant genes of *Drosophila melanogaster*.** Proc. Nation. Acad. Sci. 7: 127-132. 1 fig. 1921.—A set of maps of the 4 chromosomes of *Drosophila melanogaster* is given in which the distribution of the mutant loci, based on percentages of crossing over with the necessary corrections, are brought up to date. It is noted that the greatest number of mutant genes are at one end of the 1st chromosome and in the middle of 2 and 3. This is believed to be correlated with the fact that at division the 1st (or sex) chromosome has the terminal attachment of the spindle fiber, while the other 2 large ones are V-shaped. The author states in a footnote that about 1 per cent of crossing over has now been observed between the 2 known genes in the 4th chromosome.—H. H. Plough.

229. BROTHERSTON, R. P. **Doubling in stocks.** Gard. Chron. 70: 50-51. 1921.—The writer raises a question as to the accuracy of some earlier work on the percentage of doubles in the East Lothian stocks.—A. C. Fraser.

230. CHAMBERLAIN, C. J. [Rev. of: SHARP, LESTER W. **An introduction to cytology.** 15 × 23 cm., vii + 452 p., 159 fig. McGraw-Hill Book Co.: New York, 1921.] Bot. Gaz. 72: 331, 1921.

231. CHAMPY, CH. **Changement expérimental du sexe chez le Triton alpestris Laur.** [Experimental change of sex in Triton alpestris.] Compt. Rend. Acad. Sci. Paris 172: 1204-1207. 1921.—The author had previously, by starving, prevented the annual production of sperm and caused adult males in the mating season to retain the appearance characteristic of sexually dormant winter males. The testes contained only primitive gonocytes, or these were replaced by bands of fat. Two specimens assumed female external characters after starvation. In 1 of these the author found a long adipose body on each side containing an elongated granular organ with a "perfectly characteristic oviduct," the granular organ proved to be an ovary comparable to that of a young female at transformation. "Here one observes numerous figures of the beginning of transformation of indifferent gonocytes into oocytes." This animal had been bred, functioning as a male, a year before, and the author is certain it fertilized eggs which developed normally. Hence he concludes that this is a case of complete sex reversal.—A. M. Banta.

232. CHIDESTER, F. E. **A rabbit with five legs and six feet.** Jour. Heredity 12: 192. 1 fig. 1921.—The paper describes a living rabbit with the anomalies indicated in the title.—Sewall Wright.

233. CLEMENTS, F. E. **Adaptation and mutation as a result of fire.** Carnegie Inst. Washington Year Book 19: 348-349. 1920.—Forest fire near the Alpine Laboratory exposed

the herbaceous layer to sunlight. The resulting progressive adaptation threatens to pass the species boundary, e.g., *Mertensia pratensis* approaches *M. lanceolata*, and *Erigeron glabellus* changes to approximate *E. macranthus*. Also, certain characteristic sun forms apparently originated by mutation, e.g., a new form genus of grasses originated from *Elymus*.—Merle C. Coulter.

234. COBB, PERCY W. On the significance of an experimental difference, with a probability table for large deviations. *Science* 54: 200-202. 1921.—The problem of the significance of differences between experiments A and B is discussed. A probability table is presented for deviations higher than those included within the range of most such tables with a view to giving values of P much nearer unity than usual.—John W. Gowen.

235. COLLINS, J. L. Inbreeding and crossbreeding. *Jour. Heredity* 12: 89-93. *Fig. 31-34*. 1921.—Inbreeding the cross-fertilized species, *Crepis capillaris*, reduces vigor and isolates uniform strains. Marked heterosis follows crossing of inbred strains. The behavior of this wild species is practically the same as that of maize when inbred. The article is essentially of the same subject matter as an earlier paper by the author [see Bot. Absts. 8, Entry 241].—P. C. Mangelsdorf.

236. COOK, O. F. Causes of shedding in cotton. *Jour. Heredity* 12: 199-204. *Fig. 3-6*. 1921.—This paper, which is in part a criticism of F. E. Lloyd's Environmental Changes and Their Effect upon Boll-Shedding in Cotton (*Trans. New York Acad. Sci.* 29: 1-131. 1920), deals mainly with morphological and physiological aspects of shedding, but points out that genetic factors are also involved, as shown by different behavior of Upland and Egyptian cottons growing side by side and by the abnormally high rate of shedding in certain hybrids and sports.—T. H. Kearney.

237. COULTER, J. M. *Rubus* in New England. [Rev. of: (1) BRAINARD, EZRA, and A. K. PEETERSEN. *Blackberries of New England. Their classification*. Vermont Agric. Exp. Sta. Bull. 217. 84 p., 36 pl. 1920 (see Bot. Absts. 8, Entry 233). (2) PEETERSEN, A. K. *Blackberries of New England; genetic status of the plants*. Vermont Agric. Exp. Sta. Bull. 218. 34 p., 19 pl. 1921.] *Bot. Gaz.* 72: 336. 1921.

238. COULTER, M. C. [Rev. of BRIDGES, CALVIN B. *Triploid intersexes in Drosophila melanogaster*. *Science* 54: 252-254. 1921 (see Bot. Absts. 10, Entry 1685).] *Bot. Gaz.* 72: 408-410. 1921.

239. CREW, F. A. E. Sex reversal in frogs and toads. A review of the recorded cases of abnormality of the reproductive system and an account of a breeding experiment. *Jour. Genetics* 11: 141-181. 23 fig. 1921.—The author serializes the recorded cases of intermediate sexual conditions in anurans and interprets them as stages in the sex reversal of individuals. Degeneration of ovaries and other female structures and progressive development of corresponding male structures is believed to be due to hormones from testicular tissue. A very small amount of testicular tissue is efficacious. The author does not discuss the beginning of testicular tissue in sex intergrades. He regards such transformed individuals as "somatic males" (masculinized females). The author bred one somatic male to a normal female and all offspring (774 in number) which survived to enable determination of sex were normal females; the controls were 46 per cent males. Hence it is suggested that these masculinized females are XX in chromosome constitution. The author cites similarity to the free-martin case, and questions the interpretation of Bidder's organ as a rudimentary ovary since he believes ever so little testicular tissue in these amphibians is destructive to all female sexual structures (the Müllerian ducts excepted).—A. M. Bandt.

240. CULP, W. Vererbung und Missbildung. [Heredity and abnormality.] *Arch. Path. Anat. u. Physiol.* 229: 345-352. 1921.—The author suggests a classification for the mor-

phological and functional deviations from the norm based on the degree to which these are hereditary and the relative amount of difference between them and the norm. He defines heredity as that force which causes one generation to react to an identical stimulus in the same way as the preceding generation. Variations arise because the stimuli are usually not identical.—The 1st class is composed of modifications, which are slight deviations from the norm and are not hereditary. The 2nd class comprises the mutations, which are farther removed from the norm than are the modifications and are hereditary. All hereditary anatomical abnormalities belong to this class, as do hereditary diseases such as haemophilia. Mutations arise from external causes. To the 3rd class belong abnormalities, such as amelia, which have not as yet been proved hereditary. The 4th class comprises monstrosities which are great deviations from type and are never inherited.—*B. Whiteside.*

241. CUNNINGHAM, J. T. **Heredity and acquired characters.** *Nature* 106: 630. 1921.—In this reply to the contention of Sir Archdall Reid that biological terminology is vague, the writer contends that the confusion to which Reid refers is due to his (Reid's) inability to understand the terminology of biologists, and cites an instance in a previous letter in which Reid contradicts himself in his attempt to teach biologists the proper use of terms. [See also *Bot. Absts.* 11, Entries 221, 282, 299, 300, 301, 302.]—*C. B. Hutchison.*

242. DARWIN, L. **The field of eugenic reform.** *Sci. Monthly* 13: 385-398. 1920.—In this address before the Second International Congress of Eugenics held in New York, Sept. 22-28, 1921, it is pointed out that the aim should be to increase the rate of multiplication of stocks above the average and to decrease it among the less fit. Single-factor harmful qualities can be eliminated if parenthood is prevented. If a character must be transmitted by both parents to develop it takes longer to stamp it out since the individuals not doubly endowed do not develop it but are able to transmit it. Segregation is the kindest treatment for feeble-mindedness. But where this is objected to, sterilization might be suggested as a voluntary method of avoiding segregation.—*L. Pace.*

243. DUNN, L. C. **Types of white spotting in mice.** *Amer. Nat.* 54: 465-495. 3 fig. 1920.—Albinism and white spotting are genetically distinct. Range of variability in white spotting is from black-eyed white to colored mice with a few white hairs on forehead, feet, tail, or belly. Spotted mice have been divided into black-eyed whites, piebalds, and blaze. Piebalds and black-eyed whites are genetically distinct, each being due to a gene distinct from and independent of the other, neither allelomorphous nor linked. Black-eyed whites are *W^{ss}ss*; piebalds are *w^{ss}ss*, where *w* stands merely for "not black-eyed white." Normally the black-eyed white is from 100 to 70 per cent white dorsally. Expression of complex of genes producing black-eyed white spotting is subject to modification by a gene or genes determining the increased amount of pigment and decreased amount of white spotting. Addition of such darkening modifiers decreases the mean amount of white spotting to as low as 50 per cent white.—Expression of the gene for piebald spotting is subject to modification in the same direction and by the same gene or genes which modify expression of black-eyed white. When those darkening modifiers are present in mice pure for piebald (*ss*), most of the mice are 10 per cent or less white dorsally, while those with larger per cent white are much rarer than among piebalds lacking darkening modifiers.—When black-eyed white is crossed with self, approximately half the progeny is spotted and half self, or show at most only small white ventral spotting. Little found these spotted mice to be double heterozygotes (*W^wss*) and called them type "A." They are indistinguishable somatically from piebalds, and in certain cases from selfs, although possessing an entirely different genetic constitution.—When type "A" animals are interbred, mice difficult to distinguish from either type "A" or piebalds are produced. These are called dark spotted, type "C," and are *W^wss*.—Since there is some correlation between the amount of spotting in parents and offspring, the author prefers the explanation presuming the occurrence of modifying genes separable in heredity from other genes for spotting,—yet coming into expression only in the presence of the main gene or genes for spotting,—to the fluctuation hypothesis.—Main spotting genes, *W* and *s*, have been found

to be properties of distinct loci in different chromosomes (Dunn, 1920). Therefore, the author concludes that a gene or genes modifying *W* and *s* must determine general conditions rather than specific conditions associated with a particular spotting gene; also, from present evidence, that these modifying genes alter the internal environment of enzyme and chromogen on which the main spotting genes *W* and *s* act to bring about their specific effects.—The genotype *Ss* ordinarily produces self coat, but in the presence of an additional modifying gene produces on the ventral surface a small amount of white spotting varying from a few white hairs to 12 per cent of the surface.—The author believes that the pattern of piebald mice is due to a complex of genes modifying the expression of 1 main gene, and that each such gene in the complex may determine the non-development of pigment in one part of the pelage. These hypotheses are now being tested by inbreeding methods advanced by East.—*E. E. Jones.*

244. DURST, C. E. Experiments in selecting tomatoes for wilt resistance. *Proc. Amer. Soc. Hort. Sci.* 1917: 51. 1918.—*Fusarium Lycopersici*, the cause of tomato wilt, has become very prevalent in many trucking regions and causes serious damage. Attempts to control the disease by chemicals have been unsuccessful. A test of 48 varieties in 1916 showed considerable variability in susceptibility, but unfortunately the least susceptible were frequently lacking in desirable qualities. However, desirable strains have been developed by selection which live through the season on thoroughly infected roots. Of these, New Century, Paragon, and Imperial are the most promising. In most cases the yield of marketable fruit has been doubled.—*C. E. Myers.*

245. ERNST, A. Apogamie oder dauernde Parthenogenesis? [Apogamy or continuing parthenogenesis?] [Rev. of: WINKLER, H. Verbreitung und Ursache der Parthenogenesis im Pflanzen- und Tierreiche. (Distribution and causes of parthenogenesis in the plant and animal kingdoms.) 231 p. Jena, 1920.] *Zeitschr. Indukt. Abstamm.- u. Vererb.* 26: 144-160. 1921.—The reviewer maintains his previously expressed view that the diploidy and ovogamety (parthenogenesis) of the apogamous race of *Chara crinita* are related conditions, resulting from a crossing of the haploid, functionally sexual *C. crinita* (♀) with an unknown species of *Chara* (♂). Winkler has suggested 2 possible explanations of this case of apogamy: (a) Doubling of the chromosome number in the apical cell of a female plant of the haploid race, the plant in question being already parthenogenetic; and (b) that in the germination of a sexually produced zygote chromosome reduction occurred, followed by a union of 2 of the 4 haploid nuclei thus produced, the remaining 2 nuclei (instead of 3 as in the typical case) degenerating. These suggestions are discussed at length. The reviewer had contented himself with the establishment of a working hypothesis, and had discussed this fully because he foresaw the difficulties and long duration of the investigations still to be undertaken, and because he hoped that others might carry on similar investigations upon other forms. The justification of the new hypothesis is not affected by Winkler's criticism. The latter points out no method by which causes of apogamy in plants can be more satisfactorily explained, or by which the experimental production of apogamous races can be attempted with better prospect of success. On the other hand, Winkler has materially advanced the whole problem by the demonstration of numerous cases of the permanent loss of bisexual reproduction and its replacement by apogamy (continuing parthenogenesis) in animals, thus materially widening the known range of the phenomenon and suggesting new possibilities for the solution of related problems.—*C. E. Allen.*

246. ERNST, A. Die Nachkommenschaft aus amphimiktisch und apogam entstandenen Sporen von *Chara crinita*. [The progeny arising from amphimictic and apogamous spores of *Chara crinita*.] *Zeitschr. Indukt. Abstamm.- u. Vererb.* 25: 185-197. 1921.—Plants collected from a pond near Budapest were of 3 forms, males, females with eggs capable of fertilization, and females with exclusively parthenogenetic eggs (spores). The last-named class corresponds to the parthenogenetic plants found exclusively in most known stations for this species. No transition forms between wholly functional and wholly parthenogenetic females have

been found. The chromosome number in male and in functional female plants is 12; in parthenogenetic females, 24. Of 292 plants taken directly from the Budapest station, or derived from spores (zygotes and parthenogenetic eggs) collected in the same locality, 141 were males, 129 functional females, and 17 parthenogenetic females. Male plants were collected by F. Filarszky from the same pond and from 2 neighboring pools, which have since disappeared. All other collections of this species from the territory about Budapest have consisted solely of parthenogenetic females. The parthenogenetic plants reproduce much more abundantly than the functional females. Since the parthenogenetic form is present in the pond in proportionately small numbers, its presence may be considered as the result of a recent development (or introduction) into this particular locality.—Of 800 zygotes from the functional females 412 germinated; 153 female and 175 male plants resulted (a proportion of 100:114), and 84 died before producing sex organs. No parthenogenetic females appeared. The larger proportion of males may be due in part to the fact that they produce sex organs earlier than the females; hence the majority of the plants that died before reaching sexual maturity are considered as probably female. Zygotes resulting from a fertilization of one of these females by a male of the same generation produced 36 females and 38 males; 47 plants died before sex organs appeared.—Four hundred spores borne by parthenogenetic females grown in culture with male plants gave 118 parthenogenetic females and 30 plants which died while still sterile. From 400 spores borne by parthenogenetic females grown in the absence of male plants, came 72 parthenogenetic females and 20 plants that died while sterile.—Results of other experiments in which the numbers of germinations were smaller gave corresponding results. The author's conclusions are: (1) Zygotes of functional females produce haploid males and females in approximately equal numbers. (2) Spores of parthenogenetic plants produce only diploid parthenogenetic females. (3) The oogones of parthenogenetic females are not capable of fertilization. The non-occurrence of fertilization in parthenogenetic females depends upon the fact that their oogones do not undergo the changes which, in functional females, make possible and easy the entrance of antherozoids. Whether the eggs of such plants are inherently incapable of fertilization is an unsettled question. It is possible that more extensive experiments may show that, rarely, parthenogenetic plants produce fertilizable eggs, and that an occasional vegetative segregation in a parthenogenetic strain may produce one or the other functionally sexual haploid form.—*C. E. Allen.*

247. FAIRCHILD, DAVID. A genetic portrait chart according to Sir Francis Galton, in which the size of each likeness shows the proportion which each ancestor plays in the children's inheritance. *Jour. Heredity* 12: 213-219. Fig. 7. 1921.—There is presented a family chart of 5 generations of the writer's family, constructed of photographs genetically arranged, the relative size of the portraits indicating the hereditary contribution to the last generation according to Galton's theory. The accompanying article explains the method of preparation and the interest and advantage of such a family chart.—*Howard J. Banker.*

248. FISCHER, E. Die Beziehungen zwischen Sexualität und Reproduktion im Pflanzenreich. [Relation between sexuality and reproduction in the vegetable kingdom.] *Mitteil. Naturf. Ges. Bern* 1918: xviii-xxi. 1918.—To denote the rhythmic appearance of haplonts and diplonts the author prefers the expression Alternation of Nuclear Phases to Alternation of Generations. The different vegetative stages, resting stages, and the various forms of reproduction fit into the scheme of alternation of nuclear phases in various ways. The author calls attention to the degrees of differentiation in the haplont and diplont beginning with the lower plant forms and progressing to the higher and cites evidences of various forms of reproduction: (1) In the haplonts by zoospores, conidia, etc., or by the fusion of gametes to form new independent individuals; (2) in diplonts vegetatively by cuttings, bulbs, etc., or by tetra-cytes. A zygote may be formed without a new individual resulting; likewise tetra-cytes, resulting from the reduction process on the part of the developed zygote, may not form new individuals. Hence in some cases one may speak of sexual reproduction—reduction is the result of a sexual process and tetra-cytes follow reduction. The relation between sexuality and reproduction being complicated and varied, it is considered wisest to discriminate between sexual and asexual reproduction. Analogous to this discrimination in the course of development is that between growth period and rest period.—*Helen Bergfried.*

249. FISCHER, E. [German rev. of: KARPLUS, J. P. *Zur Kenntnis der Variabilität und Vererbung am Zentralnervensystem des Menschen und einiger Säugetiere. (Familienuntersuchungen mit Berücksichtigung von Geschlecht und Entwicklung.)* (Variation and heredity in the central nervous system of man and several other mammals. Family studies with reference to sex and development.) 234 p., 6 pl., 57 fig. Franz Deuticke: Leipzig and Vienna, 1921.] *Zeitschr. Morphol. u. Anthropol.* 22: 47-48. 1921.

250. FLEISCHER, B. *Über myotonische Dystrophie mit Katarakt.* [On myotonic dystrophy with cataract.] *Arch. Ophthalmol.* 96: 91-133. 1918.—Myotonic degeneration, very often accompanied by cataract, usually appears in families having a preceding history of simple cataract and other "stigmata" of degeneration. Its severity tends to increase with succeeding generations, until finally with the other stigmata becomes so destructive that the family dies out.—*M. F. Weymann.*

251. FLEISCHER, BRUNO, und WILHELM JOSEPHANS. *Ein Beitrag zur Frage der Vererbung der familiären Sehnervenatrophie (Leberscher Krankheit).* [Contribution to the question of the inheritance of familial atrophy of the optic nerve (Leber's disease).] *Arch. Russ.- u. Gesellschaftsbiol.* 13: 129-158. 5 pl. 1920.—A very complete review of the literature on Leber's disease shows that it has been regarded as a defect carried in the accessory chromosome and consequently transmitted as is color-blindness. But the authors, after studying a large number of cases and those in the literature, state that all cases of hereditary transmission have been traced through the female line alone, never through the male. Attention is called to the fact that a number of patients ascribe the beginning of the disease to a cold, and that in Hensen's series cold and exposure seemed to predispose to it. This etiological factor is emphasized and a question raised as to whether the disease can be regarded as a sex-linked hereditary trait.—*M. F. Weymann.*

252. FRUWIRTH, C. *Zur Inzestzuchtfrage bei Roggen.* [On the question of self-fertilization in rye.] *Illus. Landw. Zeitg.* 41: 33-34. 2 fig. 1921.—Experiments were begun with rye in 1904 to determine whether green and yellow kernel colors can be fixed, and whether and to what extent inbreeding is possible. A green-seeded and a yellow-seeded strain were isolated from selections in Petkus rye. Von Rümker in 1909 reported like results in rye breeding. Fruwirth's method has been to sow a part of the seed of each selected plant in a small plot and to cover the plants before blooming with oil cloth (in earlier years oiled paper) on a wooden frame, sib-matings resulting. Some resulting types are undesirable, 1 being wholly sterile. Crossing 2 strains developed by such inbreeding give an F_1 of much greater productivity, as is shown with 2 types developed from Zealand rye. Inclusion of single plants in such inclosures, thus enforcing self-pollination, has resulted in entire sterility or in much reduced seed production and weakening of the strain.—*C. E. Leighty.*

253. F[YSON], P. F. [Rev. of: BATESON, W. *Root cuttings and chimaeras II.* *Jour. Genetics* 11: 91-97. Pl. 13-14. 1921.] *Jour. Indian Bot.* 2: 213. 1921.

254. F[YSON], P. F. [Rev. of: RANGASWAMI AYYANGAR, G. N. *Some rice breeding experiences.* *Agric. Jour. India* 6: 156-168. 1921.] *Jour. Indian Bot.* 2: 213-214. 1921.

255. GASSNER, GUSTAV. *Beiträge zur physiologischen Charakteristik sommer- und winterannueller Gewächse, insbesondere der Getreidepflanzen.* [Contributions to the physiological characteristics of growth of summer and winter annuals, especially the cereal plants.] *Zeitschr. Bot.* 10: 417-480. 2 pl., 7 fig. 1918.—Seeds of different crop plants were germinated in quartz sand at temperatures 1-2°, 5-6°, 12-24°C. After the plants had reached 20-25 mm. length, all were removed to fertile soil and grown under uniform conditions. Differences were noted in the behavior of winter and spring forms of rye and wheat, but not of barley. Similar, but not identical, experiments were conducted with other plants, including root crops, garden vegetables, and flowering plants. The results with rye are typical: Winter

rye germinated at 1-2°C. from February 21 to June 18, formed shoots May 19 to August 14; germinated at 5-6°C. from February 26 to April 28, formed shoots May 24 to August 28, but those germinated May 8 to June 26 did not form shoots; germinated at 12°C. March 2 to April 13, formed shoots May 30 to August 24; germinated April 20 to June 29, no shoots; germinated at 24°C. March 3 to March 30, formed shoots June 2 to July 28; germinated April 7 to July 6, no shoots. Spring rye, on the other hand, germinated under identical conditions formed shoots in every case.—*C. E. Leighty*.

256. GATES, R. RUGGLES. **Heredity.** *Nature* 106: 440. 1920.—It is pointed out that fundamental differences exist between variations, in that some are acquired and others are germinal. The article is a criticism of one by Sir Archdall Reid [see *Bot. Absts.* 11, Entries, 300, 301, 302].—*L. R. Waldron*.

257. GATES, R. RUGGLES. **The genetics of sex.** *Nature* 107: 571-572. 1921.—This article summarizes, with comments and some discussion, recent researches concerning genetics of sex. It is held that departure of equality in sex ratios, as often found, supplements rather than negatives chromosome hypothesis.—*L. R. Waldron*.

258. GATES, R. RUGGLES. **The inheritance of acquired characters.** *Nature* 107: 89. 1921.—This consists mainly of a review of E. W. MacBride [see *Bot. Absts.* 9, Entry 252]. Gates states that both mutation and a Lamarckian factor may be supposed to have played their part in evolution.—*L. R. Waldron*.

259. GLASER, OTTO. **Fertilization and egg-secretions.** *Biol. Bull.* 41: 63-72. 1 fig. 1921.—The author confirms his earlier conclusion that egg secretions are a factor in fertilization. He finds that the activating agent and Lillie's agglutinating substance are different, the activating agent being a lipolytic ferment. The nature of the agglutinating substance is uncertain. The action of the lipolytic agent is non-specific, but the actions of agglutinators of different species are unlike. [See also *Bot. Absts.* 8, Entry 260.]—*A. Franklin Shull*.

260. GODDARD, HENRY HERBERT. **Human efficiency and levels of intelligence.** 128 p. Princeton Univ. Press: Princeton, 1920.—This work consists of 4 lectures delivered at Princeton University in April, 1919. The 1st lecture, on Levels of Intelligence, after discriminating between intelligence and knowledge, states that "every human being reaches at some time a level of intelligence beyond which he never goes." From the army tests is revealed the "enormous proportion of the human race that is of moderate intelligence." The 2nd lecture, on Efficiency, attempts to show that the social efficiency of a people depends on their organization on the basis of their levels of intelligence so that "each person has work to do that is within his mental capacity and at the same time calls for all the ability that he possesses." The 3rd lecture deals with delinquency and shows that this is largely a problem of low-grade mentality. The final lecture discusses the serious question whether a successful democracy can be maintained "where the average mentality is thirteen," and emphasizes that this is possible through the rule of the higher intelligence, since "the masses will vote for the best and most intelligent if they are made to feel that these same intelligent people have the welfare of the masses at heart."—*Howard J. Banker*.

261. GOLDSMITH, W. M. **A living double-headed calf.** *Jour. Heredity* 12: 237-239. 3 fig. 1921.—This is a description of a double-headed calf, still alive at 4 months of age.—*Sevall Wright*.

262. GRAFENBERG, E. **Die entwicklungsgeschichtliche Bedeutung der Hyperdaktylie menschlicher Gliedmassen.** [Developmental significance of hyperdactyly in human extremities.] *Studien Path. Entwickl.* 2: 565-619. 24 fig. 1920.—This is a contribution to the morphology of human hyperdactyly, with passing reference to heredity.—*C. H. Danforth*.

263. GRIFFEE, FRED. Comparative vigor of F_1 wheat crosses and their parents. Jour. Agric. Res. 22: 53-63. 1921.—Varieties of *Triticum vulgare* were crossed with each other and with 1 variety each of *T. compactum*, *T. dicoccum*, and *T. durum*. *T. compactum* was also crossed with *T. dicoccum* and *T. durum*. Pure lines were used. The weight of seed of the immediate crosses compared with "incrossed" seed of the seed parent, i.e., seed arising from artificial pollinations within the pure line, was significantly higher in 3 *vulgare* \times *vulgare* crosses, significantly lower in the *vulgare* \times *durum* cross, and about equal in *compactum* \times *vulgare*, *dicoccum* \times *vulgare*, and *dicoccum* \times *compactum* crosses. In the F_1 generation height of the tallest culm in the 17 crosses was greater than both parents in 8 cases, higher than the average in 11, lower than the lower in 4. In total culm length the F_1 was higher than both parents in 6 cases, higher than the average in 8, lower than the lower in 2, and equal to the lower in 1 case. In average yield of grain per plant the F_1 of *vulgare* \times *vulgare* crosses and of *vulgare* \times *compactum* crosses exceeded the parental average in each case and in 6 of 8 cases exceeded the better parent. The F_1 generation of *dicoccum* or *durum* crossed with varieties of *vulgare* or *compactum* showed a high degree of sterility, averaging 70 to 75 per cent of barren florets. Parental varieties averaged 19 per cent barren florets, while F_1 *vulgare* \times *vulgare* and *vulgare* \times *compactum* averaged 15 per cent.—C. E. Leighty.

264. HALDANE, J. B. S. Linkage in poultry. Science 54: 663. 1921.—The author reports a crossover value of 34.6 ± 3.6 between sex-linked genes *B* and *S* in poultry. *B* is a gene for barring and *S* an inhibitor of yellow pigmentation causing "silver." The data are taken from 78 birds. The study is being continued.—William A. Lippincott.

265. HOOVER, J. J. Milk production of young cows. Jour. Heredity 12: 166. 1921.—This is a study of the milk and butter-fat production of Jersey cows relative to their age.—Sewall Wright.

266. HERWERDEN, M. A. VAN. [Dutch rev. of: MULLER, H. J., and E. A. ALTENBURG. The rate of change of hereditary factors in *Drosophila*. Proc. Soc. Exp. Biol. Med. 17: 10-14. 1919.] Genetica 3: 503-504. 1921.

267. HURST, C. C. On the origin of the moss rose. Gard. Chron. 70: 160, 174. 1921.—The old moss rose of the garden is variously classified as *Rosa muscosa* or as a variety of either *R. centifolia* or *R. gallica*. Darwin concluded that it was probably a bud variation of *R. centifolia* L. The 1st recorded appearance of this type was in 1696. Since then 2 similar bud mutations have arisen from the cabbage rose, *R. centifolia*, one the moss rose De Meaux which appeared in 1801 from the dwarf cabbage rose De Meaux, and the other the Unique Moss from the white cabbage. In 1807 a single-flowered moss rose appeared as a bud variation of the common moss. This was fertile and gave rise to many garden hybrids. The high degree of sterility in the cabbage and common moss roses makes it difficult to apply breeding tests. On at least 10 occasions the moss has shown bud reversions to the cabbage rose. The single moss has given both moss and plain roses when crossed with plain. There is good reason to believe that the moss rose has arisen from the cabbage rose by a change to a dominant factor in 1 member of an allelomorphic pair of genes. It is therefore a heterozygous dominant.—A. C. Fraser.

268. IRELAND, ALLEYNE. Democracy and the human equation. 251 p. E. P. Dutton & Co.: New York, 1921.—This is a criticism of popular government with special reference to the American form. Chapters 4 and 5 deal with the influence of heredity and environment in the solution of problems of government. The 1st of these chapters, largely a rewriting and amplification of the author's article on Democracy and the Accepted Facts of Heredity [see Bot. Absts. 3, entry 261] reviews the discussions caused by this paper. The 2nd of these chapters discusses the relation of heredity to environment, and reviews the work of Woods and of Redfield in this connection. Believing that heredity exerts "the dominating influence," the author concludes that hitherto popular government has been constructed on the principle

of the dominating influence of environment in developing the quality of citizenship and that greater consideration should and hereafter probably will be given to the influence of heredity.—Howard J. Banker.

269. KEMPTON, J. H. Heritable characters of maize. VIII. White sheaths. Jour. Heredity 12: 224-226. Pl. 1. 1921.—White sheaths is a variation in which the leaf sheaths and husks fail to develop chlorophyll and remain white. Although the Mendelian ratios are not alike in the sister progenies, it is concluded that the character is a simple Mendelian recessive to the normal green form.—J. H. Kempton.

270. KEMPTON, J. H. Waxy endosperm in Coix and sorghum. Jour. Heredity 12: 396-400. 1 pl. 1921.—Waxy endosperm, first found in maize from China and later in maize from Burma and the Philippines has been found now in *Coix lachryma Jobi* from these regions and in *Andropogon sorghum* from China and the Philippines.—J. H. Kempton.

271. KEY, WILHELMINE E. Better American families. IV. Jour. Heredity 11: 358-363. 1920.—The paper discusses briefly some of the social forces in the development of American civilization and considers "certain American families of superior and superlative worth and the part which inheritance played in making such worth possible." The families considered are: Abbey, Fairbanks, Pomeroy, Herreshoff, and Astor. The article closes with a "genetic classification of American strains."—Howard J. Banker.

272. KEY, WILHELMINE E. Better American families. V. Jour. Heredity 12: 30-35. 1921.—The hereditary characteristics of the Beecher, Abbott, Edwards, Adams, Lowell, Lawrence, and Roosevelt families and their contributions to American idealism are discussed.—Howard J. Banker.

273. KIDD, WALTER. Biological terminology. Nature 108: 11-12. 1921.—In certain modern tame horses uniform hair slope from lower jaw to chest has been modified into (hereditary) patterns brought about after many generations by friction of moving collar. These patterns are "acquired characters" although at present inherited. The author suggests use of Semon's term "engram" for an initial variation which has the potential value of an inherited character.—L. R. Waldron.

274. KRABBE, K. H. Congenital familial spinal muscular atrophies and their relation to amyotonia congenita. Brain 43: 166-191. 1920.—The writer finds that "the cases which have been described as amyotonia congenita represent really 2 different diseases:—One of these, amyotonia congenita, is a benign disease. . . . not familial." From this should be separated certain enumerated cases which "must probably be considered as cases of congenital familial progressive spinal muscular atrophy." The paper, taken up largely with pathological and clinical differentiation of the 2 types of disease, emphasizes the familial character of the latter. There is no discussion of the method of inheritance, but 3 pedigree charts are published. A bibliography of 28 titles is given.—Howard J. Banker.

275. LANDIS, EUGENE M. An amiconucleate race of *Paramecium caudatum*. Amer. Nat. 54: 453-457. 1920.—This preliminary account of the discovery of an amiconucleate race of *Paramecium caudatum* is very interesting in view of the similar condition found in *Oxytricha* by Dawson [see Bot. Absts. 5, Entries 347, 348]. Such an amiconucleate race raises many important questions in regard to the cytology of cell division, conjugation, genetics, and, if there be such, endomixis. This race has the power of forming extra contractile vacuoles and is the multivacuolated race with which Hance worked [Jour. Exp. Zool. 23: 287-333. 1917]. It is larger than the "wild" races observed and shows some modifications of the buccal groove and differences in the cytology of the macronucleus.—W. H. Taliaferro.

276. LEARMONTH, J. R. The inheritance of specific iso-agglutinins in human blood. Jour. Genetics 10: 141-148. 1920.—The author gives data from 40 families chosen at random. From a study of sera of parents and children, arranged according to their iso-agglutinating action into the usual 4 groups, he infers that the iso-agglutinins present in human blood are inherited and that as a general rule the inheritance follows Mendelian laws. He regards the agglutinophilic capacity as due to different factors,—in group II to factor A, in group III to factor B. In group I both these characteristics are found, and in group IV neither. Certain parents are seemingly heterozygous for 1 or both factors. There was no indication of sex-linked inheritance. A modifying factor may exist, since iso-agglutinins formerly absent in the serum of a given individual may appear after that individual has successfully withstood a systemic infection.—M. F. Guyer.

277. LEHMANN, E. Bemerkungen zu dem Aufsätze von O. Renner: Mendelsche Spaltung und chemisches Gleichgewicht. [Remarks on Renner's article: Mendelian splitting and chemical equilibrium.] Biol. Zentralbl. 40: 277-286. 1920.—The author summarizes the argument against Renner's theory [see Bot. Absts. 11, Entry 303]. If gene equals radicle, then, in the reduction division, reversible reactions must be involved. The laws of reversible reaction can not explain the separation of genes as it occurs in the germ cell. The assumption that a chromomere, chromosome, or the entire chromatin is a molecule leads to the absurdity that the entire organism is a single molecule. It is considered difficult to understand how molecules differing in only a single gene could be so easily separated when palmitic and stearic acids in mixture are separated with such difficulty. The author considers it best to regard the processes taking place at synapsis colloidal chemical in nature, in which reactions and also separations of mixtures occur, and in which catalytic agents probably play a part.—L. Harvey M. Smith.

278. LEHMANN, ERNST. Über die Vererbungsweise der pentasepalen Zwischenrassen von *Veronica Tournefortii*. [On the method of inheritance of the 5-sepaled eversporting varieties of *Veronica Tournefortii*.] Zeitschr. Bot. 13: 481-511. 1921.—Investigations here reported constitute a continuation of the author's previous studies in *Veronica*. Subspecies *Corrensiana*, exhibiting about 1 per cent of 5-sepaled flowers, crossed with a variety of *Aschersoniana*, showing about 70 per cent of 5-sepaled flowers, gave F_1 with high percentage of 5-sepaled flowers, and a continuous series in F_2 ranging from 0 to 100 per cent with marked abmodality toward higher percentages. Behavior in subsequent generations was somewhat irregular; but a race, named *tubingensis*, was isolated which constantly exhibited about 95 per cent of 5-sepaled flowers. *Corrensiana* crossed with *tubingensis* gave F_1 and F_2 similar to those just described. With another variety of subspecies *Aschersoniana* having a low percentage of 5-sepaled flowers, the results were reversed; F_1 was low and F_2 , although exhibiting a continuous series, showed marked abmodality toward lower percentages. The author concludes that a simple monohybrid scheme can not account for the results, and shows how a multiple-factor interpretation may be applied to them. He also argues that studies of comparative morphology and development of the 5-sepaled condition in different species and varieties of *Veronica* favor the multiple-factor hypothesis, since different expressions of the 5-sepaled condition must depend upon different factor changes.—R. E. Clausen.

279. LINGELSHIM, ALEXANDER. *Polemonium coeruleum* \times *reptens* (P. Limprichtii Lingelsh.) die erste sichergestellte Hybride der Gattung. [*Polemonium coeruleum* \times *P. reptens* (P. Limprichtii Lingelsh.), the first authentic hybrid of the genus *Polemonium*.] Österreich. Bot. Zeitschr. 69: 164-166. 1920.—Among plants of the species *Polemonium reptens* growing in the botanical gardens of Breslau several differed markedly from the species, resembling in some respects *P. coeruleum*, which was growing nearby. A detailed study of the characters of the hybrid showed both *reptens* and *coeruleum* characters. These hybrid plants apparently developed seed, but none has been sown and tested. Except for the genus *Phlox*, hybrids in the Polemoniaceae family are rare. Of the 29 species of *Polemonium* studied by Brand, not a single authentic hybrid was noted.—E. W. Lindstrom.

280. M., S. [Rev. of: GATES, R. RUGGLES. *Mutations and evolution*. New Phytol. 19: 26-34, 64-88, 132-151, 172-188, 213-253. 1920.] Jour. Botany 59: 265. 1921.

281. MACBRIDE, E. W. *Heredity and acquired characters*. Nature 106: 501. 1920.—This controversial article critically discusses the exact meaning to be attributed to the term "acquired characters" and holds that Sir Archdall Reid [see Bot. Absts. 11, Entry 301] entirely subverts its meaning. The acquired evergreen habit of a peach grown at Réunion is cited.—*L. R. Waldron*.

282. MACBRIDE, E. W. *Heredity and acquired characters*. Nature 106: 630. 1921.—This reply to the criticisms of Sir Archdall Reid that biological terminology is loose and vague gives definitions of certain biological terms which Reid had designated as meaningless. [See also Bot. Absts. 11, Entries 221, 241, 299, 300, 301, 302.]—*C. B. Hutchinson*.

283. MARCH, M. LUCIEN. *The consequences of war and the birth rate in France*. Sci. Monthly 13: 399-419. 1921.—This is an address before the Second International Congress of Eugenics, held in New York, Sept. 22-28, 1921.—France lost 1,400,000 inhabitants in the late war, most of them fit to produce children. Among the survivors are 800,000 total invalids unable to produce strong, healthy children. These, with a deficit of births of 400,000, make a direct loss of over 2,000,000. Suggestions for increasing the birth-rate are offered.—*L. Pace*.

284. MAYOR, JAMES W. *On the elimination of the X-chromosome from the egg of Drosophila melanogaster by X-rays*. Science 54: 277-279. 1921.—This is a preliminary note without detailed data of experiments still in progress. The author states that 16 virgin females flies homozygous for normal red eye were X-rayed before mating to white-eyed males. Nineteen sister females were similarly mated untreated as controls. Of the X-rayed females 12 produced one or more white-eyed sons while no exceptional offspring appeared in the controls. Since white eye is a sex-linked character this is taken to indicate that the X-ray treatment eliminated the X-chromosome in the developing egg "while preparing for one of the maturation divisions." Certain of the white-eyed males used were also homozygous for dumpy, a 2nd chromosome character, but none of the white-eyed exceptional sons was dumpy. It is therefore held that the 2nd chromosome was not affected by the X-ray. Similar treatment of virginal females which were afterward mated to eosin-miniature and to scute-echinus-cut-vermilion-garnet-forked males is stated to have given similar results, the exceptional sons showing all the characters. This is believed to indicate that the X-ray affects all rather than part of the X-chromosome.—*H. H. Plough*.

285. NACHTSHEIM, HANS. *Zytologische und experimentelle Untersuchungen über die Geschlechtsbestimmung bei Dinophilus apatris Korsch*. [Cytological and experimental studies on the sex determination of *Dinophilus apatris*.] Arch. Mikrosk. Anat. 93 (Section 2): 17-140. 4 pl., 5 fig. 1919.—Only 1 kind of spermatozoon, having 10 chromosomes (haploid number), is produced by the degenerate male. Spermatozoa are mature as soon as the male is fully developed. Females are impregnated by males of the same cocoon (their brothers) before leaving the cocoon; males usually do not leave cocoon and soon die. Sperms are delivered in packets into the body cavity of the female through puncture of the body wall, and remain for some time near the ovary. Oocytes undergo 3 periods of growth, the 1st while synapsis occurs and the chromatin is clumped into a nucleolus-like body. The 2nd period is accomplished by the fusion of a number of oocytes. Oocytes that fuse are alike in every visible respect, not being egg and nurse cells, respectively. Nuclei do not fuse, and all but 1 degenerate. How many cells fuse is uncertain, but the final product is 3-4 times as large as the original cells. The combination cells are equal in size, i.e., fusion does not differentiate small (male) eggs from large (female) ones. While the 1st 2 growth processes are going on, the sperm packets dissolve and sperms penetrate into the ovary and among the oocytes, but fertilization does not occur. In the 3rd growth period some eggs enlarge greatly

(female eggs), others very slightly (male). During this period the spermatozoa enter the oocytes, but not until after size differentiation has taken place; hence spermatozoa have no sex-determining function. During this 3rd growth period, in both male and female eggs, 20 chromosomes form 10 tetrads which later form a reticulum. There is no visible morphological cause of differentiation into male and female types of eggs. The first maturation spindle is formed before eggs are laid, but remains in metaphase until after the eggs are laid. Chromosome behavior is normal, 2 polar bodies are formed, and 10 chromosomes remain in the egg. These chromosomes do not unite into a single nucleus, but directly form chromosomes of the 1st cleavage. Centrosomes of the maturation spindles are unequal, the inner being larger than the outer. Centrosomes of the 1st cleavage spindle are likewise unequal, the larger being the egg centrosome, the smaller coming from the sperm. Cleavage is unequal, correlated with the size of the centrosomes. Twenty chromosomes, equal in size, appear in all cleavages.—Races of *Dinophilus* differ with respect to the sex ratio and size of cocoon. Sex ratios may range from equal numbers of sexes to a great majority of females, in different races. Size of cocoon is correlated with number of eggs. Races in which the sexes are equally abundant produce few eggs and small cocoons; those with more numerous females produce many eggs and large cocoons. External agents have little influence on the sex ratio; cold has no effect and warmth affects the ratio only by causing male eggs to reach maturity first, so that the 1st cocoons of a female have a high percentage of male eggs, though later cocoons return the sex ratio for the whole family to normal. Low nutrition favors male eggs, because yolk-laden female eggs can not be furnished with the necessary material and so are not laid. Impregnated females do not differ from virgin ones with respect to the sex ratio of their offspring or with respect to size of cocoon. Virgin females grow more slowly and mature sexually later; they are less healthy and often die before maturity. Unfertilized eggs, both male and female, segment, but development soon becomes abnormal and the larvae die. Monsters are sometimes produced.—*Dinophilus* is regarded as a paedogenetic annelid having affinities with the rotifers. [See also Bot. Absts. 7, Entry 1837: 11, Entry 319.]—A. Franklin Shull.

286. NAEGELI. Die deVriessche Mutationstheorie in ihrer Anwendung auf die Medizin. [De Vries's mutation theory in its application to medicine.] Zeitschr. Angew. Anat. Konstitutionsl. 6: 33-47. 1920.—Many anatomical and functional abnormalities of man may be considered as mutations. The peculiar lip found in the Hapsburg family is an example. Geneticists have tried to explain the inheritance of this abnormality by Mendel's law, but this does not account for the persistence of the characteristic through many generations in spite of marriages of members of this family with normal individuals. Many eye and ear defects are often inherited by all members of a family; in these cases there seems to be an increase in the dominance of 1 factor.—Any organ of the body may be the seat of a mutation and cause a specific illness. Thus diabetes may be due to a mutation of the pancreas, anemia to a mutation of the genital glands.—Mutations may be useful or harmful. However, even if harmful, they can not be accepted as signs of degeneration of the organism as a whole. The author emphasizes the opinion that any one abnormality predisposes to only 1 specific illness.—B. Whiteside.

287. NILSSON-EHLE, H. Über mutmassliche partielle Heterogamie bei den Speltoidmutationen des Weizens. (Untersuchungen über Speltoidmutationen beim Weizen. III.) [Concerning supposed partial heterogamy in the speltoid mutations of wheat. (Studies on speltoid mutations in wheat. III.)] Hereditas 2: 25-76. 1921.—In the progeny of speltoid heterozygotes, originated through mutation of normal wheat, there are always great numerical aberrations from the ordinary Mendelian segregation (1 normal : 2 heterozygotes : 1 mutant, the mutant always being present in too small proportion). Three speltoid series of different behaviors are described and discussed, viz., A series, in which the number of mutant individuals is decreased, and the number of normals is increased in relation to heterozygotes, explained as due to partial elimination of male speltoid gametes from fertilization; B series, originated from other original speltoid heterozygotes, in which the number of normals is frequently decreased to $\frac{1}{4}$ - $\frac{1}{2}$ of the heterozygotes, while the speltoid homozygotes are scarcer

even than in the A series; C series, in which normals are more numerous than heterozygotes, and speltoid homozygotes very scarce.—The B and C types arise independently, yet C is sometimes suddenly converted into B. The working hypothesis suggested is that in the B and C series, besides elimination of male speltoid gametes, partial heterogamy occurs in which there is differential distribution of the A (normal gametes) and *a* allelomorph (speltoid gametes) according as A in the diploid cell is introduced by an ovule (*Aa*) or by a pollen cell (*aA*), as shown by Saunders (1911) in the case of white and cream plastids in *Matthiola*. Reasons are given for identifying partial heterogamy with partial sex-linkage in wheat. Further elucidation of doubtful points awaits results of experiments under way.—*C. E. Leighty*.

288. NOYES, HILDA H. The development of useful citizenship. Jour. Heredity 11: 88-91. 1920.—In order to bring about any real and lasting improvement in the quality of a given population, 2 results must be effected; defective lines of descent must be cut off, and productivity of the more worthy lines must be increased. Steps to accomplish the 1st result are being undertaken. The present paper deals with certain practical influences which may be brought to bear to produce the 2nd result. The measures advocated are mainly 3: (1) Relieving over-burdened mothers by further development of the day nursery; (2) voluntary association of families for the purpose of giving additional support to the child-bearing mothers of the group; (3) automatic adjustment of wages to the cost of living.—*W. E. Key*.

289. ONSLOW, H. The inheritance of wing-colour in Lepidoptera. V. Melanism in *Abraxas grossulariata* (var. *varleyata*, Porritt). Jour. Genetics 11: 123-139. 1 pl., 6 fig. 1921.—*Abraxas grossulariata* var. *varleyata*, unlike most melanic varieties of moths, is recessive to the type. It is recessive also to var. *lacticolor*, and, when the 2 are crossed and the F_2 inbred, a new variety, *exquisita*, probably double recessive, appears. Var. *hazeleighensis* with black fore-wings is differentiated from the type by a factor, *l*, allowing black pigment to spread, *L* (type) localizing it in spots. This pair of allelomorphs is independent of that for *varleyata*, acting as it does upon the fore-wings only. Graphs, showing percentage of black to white on the fore-wing (as measured with a perimeter upon the magnified image from a camera lucida), show that "in certain families the amount of black in both sexes is considerably greater than in the type form, and that the darkest parents have as a rule darker offspring than lighter parents." The occurrence also of modifying factors, to account for the range of variation, is suggested. The percentage of black in $\sigma\sigma$ exceeds that in $\varphi\varphi$; "femaleness, or some factor associated with it, prevents the full development of the pigment." A variety showing a fluctuating amount of white radiation on black in *varleyata* appears to be linked to maleness, as *lacticolor* is linked to femaleness, but whether this character is dominant or recessive has not yet been determined; there is some evidence that it may be recessive. The slightly lower φ sex ratio in melanic (*varleyata*) individuals, viz., 73 $\varphi\varphi$: 110 $\sigma\sigma$, as compared with non-melanic (type and *lacticolor*). viz., 93 $\varphi\varphi$: 107 $\sigma\sigma$, in the same hybrid families, is thought possibly to suggest the elimination of females by a sex-linked lethal.—*J. H. Gerould*.

290. OSTENFELD, C. H. Some experiments on the origin of new forms in the genus *Hieracium* sub-genus *Archieracium*. Jour. Genetics 11: 117-122. 2 pl. 1921.—In earlier investigations of the sub-genus *Pilosella* of *Hieracium* the author showed that hybridization produces new forms which thereafter remain constant by means of apogamy. He now finds hybridization exceedingly rare in the sub-genus *Archieracium*, most forms being purely apogamous. Nevertheless, this sub-genus is highly polymorphic, and the author has attempted to determine the mode of origin of its numerous microspecies. Among approximately 1500 apogamous offspring of *H. rigidum*, grown at different times, he obtained 2 variant forms which remained constant through apogamy. He assumes, therefore, that new microspecies of *H. rigidum* arise by a process of "apogamic mutation." He considers these mutations after-effects of earlier hybridization, possibly having their origin in accidental elimination of single chromosomes from the "somatic egg-cell," which gives rise to the apogamic plant. Since some evidence indicates that *Pilosella* also is subject to "apogamic mutation," *Archieracium* differs from it merely in being further advanced in respect to apogamy.—*R. E. Clausen*.

291. OVEREEM, CASPER VAN. Über Formen mit abweichender Chromosomenzahl bei *Oenothera*. [Concerning forms having unusual chromosome numbers in *Oenothera*.] Beih. Bot. Centralbl. 38: 73-113. Pl. 2-7, 2 fig. 1921.—About 600 plants were studied. Methods of culture, preparation and pedigree of the material used are given, the material coming from deVries.—Triploid forms of *Oenothera Lamarckiana gigas* and *O. biennis semigigas* were crossed with each other and with other species. The posterity of triploid forms is not uniform; if self-pollinated, they show a great number of F_1 types with decided variation in habit. With reciprocal crosses between triploid forms on the one side and diploid on the other the following resulted: (1) In the egg cells of triploid forms the chromosomes vary between 7 and 14; (2) the reduction division of pollen in which a triploid form was used as male parent gave only 7 or 14 chromosomes. Pollen grains with an intermediate number are sterile. About $\frac{2}{3}$ of the pollen is sterile, and this is considered the principal cause of self-sterility in the triploid forms. The self-pollinated triploid produces triangular grains which are haploid and 4-cornered grains which are diploid.—*L. Pace*.

292. PEARSON, KARL. I. On a general method of determining the successive terms in a skew regression line. Biometrika 13: 296-300. 1921.—The author obtains the regression orthogonal functions up to the 4th order. The higher order terms may also be found, but their expressions become complicated and the probable errors very large. The conditions for linear, parabolic, or cubic regression are presented.—*John W. Gowen*.

293. PEARSON, KARL. II. Note on the "fundamental problem of practical statistics." Biometrika 13: 300-301. 1921.—This paper attempts to correct a misunderstanding concerning a former paper of the same title. The stand taken may be indicated by the following: "Those who criticise Bayes after reading his actual paper say that he ought not to have made the chances of a ball being placed anywhere on the table equally likely. He makes in fact his distribution of the variate x a straight line—a somewhat unusual form of frequency distribution. My answer to that objection to Bayes' work was that you can make the distribution of that variate—i.e., position on the table—any continuous curve you please as Bayes' Theorem with Bayes' results will flow from it equally well. Against this position my critics raise the cry that the chance is no longer x of a success and $1-x$ of a failure. Of course not, because that depends on horizontality of frequency distribution and it was merely fortuitous that for that case Bayes' variate x corresponded to a chance. In other cases the chance is a function of the variate x and not x itself. But if the critics say: Then this is not what we mean by Bayes' Theorem, I would reply: Quite so, but it is what Bayes meant by his own Theorem, and it probably fits much better the type of cases to which we are accustomed to apply it than what you mean by Bayes' Theorem."—*John W. Gowen*.

294. PEARSON, KARL. III. Second note on the coefficient of correlation as determined from the quantitative measurement of one variate and the ranking of a second variate. Biometrika 13: 302-305. 1921.—This paper presents numerical results to show the correlation of ranks, grades, and quantitative measurements of 2 variates.—*John W. Gowen*.

295. POPOFF, M. Artificial parthenogenesis and cell stimulants. Sci. Amer. Monthly 1: 312-316. 1920.—The author describes results of injecting hypertonic salt solutions into plants and applying such solutions to wounds in man, also of mechanical stimulation of wounds by massage. Plants showed increased growth, and the wounds healed more rapidly. These phenomena are compared with artificial parthenogenesis induced by chemical and mechanical stimuli and with development caused by natural fertilization. The author believes that results in all these cases are fundamentally alike, arising from cell stimulation of the same order, whether in somatic or germ cells.—*A. Franklin Shull*.

296. POULTON, EDWARD B. Heredity and acquired characters. Nature 106: 532. 1920.—The term "acquired character" is defined and explained.—*L. R. Wallbon*.

297. PRELL, HEINRICH. Anisogamete, Heterogamete und Aethogamete als biologische Wege zur Förderung der Amphimixis. [Anisogamete, heterogamete, and aethogamete as biological means of promoting amphimixis.] Arch. Entwicklungsmech. 49: 463-490. 1921.—Anisogamete is the term applied to the production of morphologically unlike germ cells; heterogamete is the production of 2 kinds of germ cells by one or the other sex, as in *Drosophila* and *Abraxas*; and aethogamete is the production of germ cells which are physiologically incompatible with the germ cells of certain other individuals of the same species. The author believes that these 3 conditions promote the bringing together of different germ plasms, and illustrates this in tabular form in *Spirogyra*, *Actinosphaerium*, monocious moss, *Ankistrothum*, *Zea*, *Tachea*, *Taenia*, *Bonellia*, *Sphaerocarpus*, *Bryonia*, *Drosophila*, *Abraxas*, *Ustilago violacea*, *Cardamine*, and *Ciona*. Automixis is the fusion of cells both of which are from the same direct cell lineage. Endomixis is self-fertilization, and exomixis is cross-fertilization.—D. F. Jones.

298. PUTTICK, G. F. The reaction of the F_2 generation of a cross between a common and a durum wheat to two biologic forms of *Puccinia graminis*. Phytopathology 11: 205-213. 1921.—Plants of the F_2 generation of a hybrid between *Triticum vulgare* (variety Marquis) and *T. durum* (variety Mindum) were inoculated in the seedling stage with spores of 2 biologic forms of *Puccinia graminis*. One form normally attacks Marquis heavily and Mindum weakly the other attacked Mindum heavily and Marquis weakly. All F_2 plants were inoculated in succession with both biologic forms, all infected parts and all spores of the 1st being removed before inoculation with the 2nd. All gradations from susceptibility to immunity to both forms of rust appeared in the F_2 plants. A single pair of genetic factors with modifying factors may account for the reactions secured from 1 biologic form, but results from the other are not so conclusive as to factors involved. Of 388 F_2 plants, 35 were highly resistant to both forms of rust.—C. E. Leighty.

299. REID, G. ARCHDALL. Biological terminology. Nature 107: 425-426. 1921.—This is a continuation of the writer's arraignment of biologists for what he considers a loose and vague terminology. He holds that biology can not claim to be an interpretative science as are physics, chemistry, astronomy, mathematics, etc., because, unlike workers in these sciences, biologists fail to submit their hypotheses to rigorous and crucial tests, but instead apparently regard the facts on which an hypothesis is founded as sufficient proof of the truth of it. [See also Bot. Absts. 11, Entries 221, 241, 282, 300, 301, 302.]—C. B. Hutchison.

300. REID, G. ARCHDALL. Biological terminology. Nature 107: 680-682. 1921.—In this a further consideration of the "chaos in biology," a science "founded mainly on unverified assumptions," the writer contends that biologists rarely crucially test their suppositions and never, as a body, accept tests when made. Until biologists quit guessing and begin to interpret on the basis of crucial testing this chaos must persist. At present biologists are impotent. However, the author is hopeful, for "—it will not always be so. Sooner or later they are sure to fall into line with other scientific workers, and found one of the greatest and most potent sciences." [See also Bot. Absts. 11, Entries 221, 241, 282, 299, 300, 302.]—C. B. Hutchison.

301. REID, G. ARCHDALL. Heredity. Nature 106: 405-406. 1920.—This is an attempt to clear up what the writer regards as a befogged situation in biological literature due to a loose terminology and the failure of biologists to use clear, precise, and definite terms in describing the results of their researches. As an illustration the author asks why biologists describe some characters as "innate," "germinal," and "inheritable" and others as "acquired," "somatic," and "non-inheritable," and maintains that acquired characters are transmissible in exactly the same sense and degree that any characters are transmissible. [See also Bot. Absts. 11, Entries 221, 241, 282, 299, 300, 302.]—C. B. Hutchison.

302. REID, G. ARCHDALL. Heredity and acquired characters. Nature 106: 596-598. 1921.—The writer replies to criticisms of his previous statements [see preceding entry] and

reiterates his contention that "biological terminology is vague and sometimes even unmeaning." He ascribes much of the extreme and apparently irreconcilable divergency of opinion of the various biological "sects and sub-sects. . . . Lamarckians, Darwinians, Neo-Darwinians, Mendelians, Mutationists, Mendelo-Mutationists, Biometricians and the like" to the "confusion of thought consequent on confusion of language" used in the literature of biology. [See also Bot. Absts. 11, Entries 221, 241, 282, 299, 300, 301.]—*C. B. Hutchison.*

303. RENNER, OTTO. *Mendelsche Spaltung und chemisches Gleichgewicht.* [Mendelian splitting and chemical equilibrium.] Biol. Zentralbl. 40: 268-277. 1920.—The author supports the theory of Johannsen et al. that genes are comparable to chemical radicles or radicle chains, and attacks Lehmann's criticism [see Bot. Absts. 11, Entry 277] of this theory as based on insufficient analogies. He proposes that the "chromatin systems of the nucleus" be considered as single molecules, and that the diploid nucleus be looked upon as a polymere of the haploid. The phenomenon of absolute linkage supports this view, the chromomeres being considered as the molecules bearing the genes absolutely linked. The entire phenomenon of linkage suggests that, if the genes are represented by comparatively simple radicles, these radicles are united into some sort of a complex which is best understood as molecular, a molecule including a chromomere, a chromosome, or even the entire chromatin mass of the nucleus.—*Harvey M. Smith.*

304. RIDDLE, OSCAR, and ELLINOR H. BEHRE. *Studies on the physiology of reproduction in birds. IX. On the relation of stale sperm to fertility and sex in ring doves.* Amer. Jour. Physiol. 57: 228-249. 1921.—It was found that spermatozoa retain their fertilizing power for a period of nearly 8 days, calculating from the time the male was removed to the laying of the egg. Since fertilization must occur shortly after ovulation, which takes place 40 to 44 hours before the egg is laid, at least a day must be subtracted from this time to give the true period from copulation to fertilization.—"No evidence was obtained indicating weakness or modified viability in the embryos obtained from stale-sperm fertilization," and such modification of the sex ratio (excess of females) as was found is attributed to other causes, especially to "reproductive overwork." It is concluded that staleness of sperm has no effect on the sex ratio.—*L. J. Cole.*

305. ROBINSON, T. RALPH. *The bud-sport origin of a new pink-fleshed grapefruit in Florida.* Jour. Heredity 12: 195-198. 3 fig. 1921.—This form, which originated in Florida from the Marsh variety, differs from the Foster and from the pink-fleshed Marsh of California in that "the flesh itself is pink," whereas in the latter forms, aside from some color on the outside of the rind, "the color lies solely in the membranes separating the pulp vesicles and in the lining of the rind."—*Howard B. Frost.*

306. RUMPEL, ALFRED. *Über identische Missbildungen, besonders Hypospadie, bei eineiigen Zwillingen, über die Entstehung und morphologische Bedeutung des Frenulum praeputii, zugleich ein Beitrag zur Frage nach der ersten Entstehung und dem Wiederver-schwinden erblicher Missbildungen.* [On identical abnormalities, especially hypospadias in identical twins, on the origin and morphological significance of the frenulum praeputii; and a contribution to the question concerning the first appearance and later disappearance of hereditary monstrosities.] Zeitschr. Path. 25: 53-96. 1921.—After describing twins of the same sex, both afflicted with hypospadias, the author reviews the literature concerned with twins showing an abnormality but finds no instance of twins of different sexes having the same defect. On the other hand, twins of the same sex have exactly the same abnormality. The conclusion is that identical twins must have the same abnormality.—Abnormalities fall into 2 classes, the 1st and largest being composed of cases of arrested development such as hypospadias and spina bifida, the 2nd of cases of excess structures such as hyperdactyly; in both classes most of the defects are hereditary. The 1st appearance of such hereditary abnormalities in a family is regarded as due to internal causes such as irregularities in the division of the germ cells from the somatic cells, or disturbances in the maturation process. The "Anlage" created

in this way leads to an abnormality if it is not destroyed in the process of fertilization. Sooner or later fertilization eliminates the "Anlage" and thus causes the abnormality to disappear. Mendel's law can not account for the 1st appearance of these hereditary abnormalities or for their final disappearance.—*B. Whiteside.*

307. RYX, G. VON. Ein neues Beispiel einer Knospenmutation bei den Kartoffeln. [A new example of bud mutation in potatoes.] Deutsch. Landw. Presse 2: 1 fig. 1918.—The author reports that in 1914 and 1915 Early Rose plants appeared which were resistant to *Phytophthora*. In 1916 and 1917 multiplication of immune plants was undertaken; a leaf variation—the part of the terminal leaflet above the greatest width shorter than in the original—also appeared. No observations were made on the 1st appearance of the variant, but the author suggests bud mutation as its cause. [From anonymous rev. in Zeitschr. Pflanzenzücht. 6: 105. 1918.]—*J. P. Kelly.*

308. RYX, G. VON. Zahlenmässige Bestimmung der Kornschönheit bei Braugerste. [Numerical determination of beauty of grains in brewing barley.] Zeitschr. Pflanzenzücht. 6: 109-166. 2 fig. 1918.—The author devises a formula for expressing plumpness of grain in barley, namely length of kernel divided by thickness of kernel. If the weight of the kernel is divided by this value a numerical coefficient is obtained which is termed "beauty of grain."—*F. P. Bussell.*

309. SANSOM, G. S. Parthenogenesis in the water vole, *Microtus amphibius*. Jour. Anat. 55: 68-77. 2 pl. 1920.—Ovarian eggs, when not extruded, were commonly found to degenerate. In a small proportion of cases, however, they underwent cleavage as far as the 4 cell stage, thereafter degenerating. Such incipient development the author believes to be fitly termed parthenogenetic. It is preceded by the formation of the 1st polar body, but apparently not of the 2nd the latter not being formed unless fertilization occurs. The author thinks it likely that ovulation does not occur in the vole without copulation.—*F. B. Sumner.*

310. SAWYER, M. L. Hybridization in Iris. Proc. Iowa Acad. Sci. 26: 363-364. 1919.—The paper describes an attempt at reciprocal crossing of *I. pseudacorus* and *I. versicolor*. "The cross seems to have succeeded with *I. versicolor* as the ovule parent, but to have failed with *I. pseudacorus* in that rôle."—*H. S. Conard.*

311. SCHIÖTZ, INGOLF. Colour-blind females: The inheritance of colour-blindness in man. British Jour. Ophth. 4: 345-359, 393-403. 1920.—Schiötz, by refined methods, tested 2200 school girls and found "20 = 0.91 per cent showing a deficient color sense." Out of 2005 males he found "202 = 10.7 per cent with defective colour sense." Hence the proportion of color-blind males to females should be about 10 to 1. "This is in accordance with other statistics," a number of which are given and discussed. The Mendelian theory of heredity is presented with an explanation of the inheritance of color-blindness as a sex-linked trait. On the basis of this theory the percentage values of color-blind women, color-blind men, and female conductors are mathematically deduced and found to be respectively 1.01, 10.07, and 18.12 per cent in the general population. These values are applied to the explanation of the statistics. The literature on the heredity of color-blindness is extensively discussed and the conclusion reached "that congenital red-green blindness invariably and without exception follows the laws of inheritance as a recessive sex-linked character." There is a bibliography of 60 numbers. [See also Bot. Absts. 11, Entry 354.]—*Howard J. Banker.*

312. SCHMIDT, JOHS. La valeur de l'individu à titre de générateur, appréciée suivant la méthode du croisement diallele. [Individual potency appraised by the method of diallel crossing.] Compt. Rend. Trav. Lab. Carlsberg [Copenhagen] 146: 1-33. 1919.—The inheritance of measurable or countable characters constitutes the subject of the investigation which tends to determine the values of the individuals for breeding. By diallel crossing is understood a thorough combination of each of the present males with each of the females. The

generative value is defined by the equation, $\frac{1}{2}(x+a) = b$, where x and a are the breeding-values of the parents and b the average value for offspring, assuming the environments to be constant. The method of diallel crossing is described under the following headings: (1) Carrying out of diallel crossing; (2) rearing of all the samples of offspring under as equal environment as possible; (3) analysis (by counting, measurement, or weighing) of the offspring and calculation of the average value for each sample of offspring; (4) calculation of the generative values of the parents.—As the samples of offspring, although their averages vary, contain the same elements differently combined, the breeding values of the parents may be determined by a simple calculation. When 2 females are crossed with the same male the difference found between the 2 samples of offspring must be due to a genetic difference between the mothers, since the father is identical; further, the difference between the generative values of the mothers must be double the difference found.—The method is tested by experiments with the common trout (*Salmo trutta* L.). Various characters are examined, especially the number of vertebrae and total length. A number of males are crossed with a number of females; by means of the average values for the samples of offspring the males and females are classified separately according to their breeding-values. By calculation the differences of generative values are found for males and for females, from which again the generative values are found apart from an unknown constant dependent on the environment.—While it has hitherto been possible to determine the breeding-value of autogamic plants only, that is by the method of pure lines, the method of diallel crossing offers a means of determining this value in animals and allogamic plants for characters which blend in the offspring.—Vilh. Ege.

313. SCHMIDT, JOHS. Racial investigations. IV. The genetic behavior of a secondary sexual character. Compt. Rend. Trav. Lab. Carlsberg [Copenhagen] 14⁸: 1-12. Pl. 1-5 (colored). 1920.—Experiments in crossing have been undertaken with 2 forms of *Lebistes reticulatus* (Peters) Regan, in one of which the male has a large black pigment spot in the dorsal fin. The experiments deal only with this exclusively male character. A male of the spot-form was crossed with a female of the other form. F₁ males all belonged to the type of the father. The F₁ individuals were intercrossed and back-crossed in both directions. There appeared to be no Mendelian segregation, either in F₂ or in the following generations, by in-and-in breeding or by crossing back. The male offspring only inherits the spot. The simplest explanation would be that the character in question depends upon a factor attached to a male Y chromosome.—A female has been observed to produce as many as 7 litters of offspring without renewed pairing. Experiments in which the same female was paired alternately with males of the 2 types show that the spermatozoa introduced last prevail.—Vilh. Ege.

314. SCHMIDT, JOHS. Racial investigations. V. Experimental investigations with *Zoarcetes viviparus* L. Compt. Rend. Trav. Lab. Carlsberg [Copenhagen] 14⁸: 1-14. 1920.—The investigations tend to elucidate whether a racial character, the number of vertebrae, is inherited, i.e., whether it is determined by internal factors. A comparison is undertaken between more than 800 mothers belonging to the same population and their respective offspring. From each sample of offspring 10 individuals taken at random were examined. It appears that the average number of vertebrae in the offspring depends upon the number of vertebrae in the mother, for the 2 series of values follow each other. To elucidate the same problem samples from 2 different populations were transplanted, put into boxes placed close to each other. The pairing and development of the young thus took place in captivity and in the same environment. The analysis of the offspring shows that the racial difference between the 2 populations had not decreased. On the other hand the average number of vertebrae, which under natural conditions had remained very constant in 6 consecutive annual classes of the same population, was sensibly altered by the transplantation. The racial differences in fish are determined primarily by internal factors, but to a certain degree also by external factors.—Vilh. Ege.

315. SCHULTZ, WALTHER. Bemerkung zur Arbeit von Knud Sand über experimentellen Hermaphroditismus. [Comment on the work of Knud Sand on experimental hermaphrodi-

tism.] *Pflügers Arch. Gesam. Physiol.* 179: 217-218. 1920.—In 1906 Schultz grafted an ovary from a female guinea-pig into a normal male guinea-pig and after 4 months the ovary was found to contain a large follicle with a large egg and several smaller follicles. Steinach and Sand have repeated these experiments fairly successfully and they appear to Schultz to claim to be the 1st workers to produce experimentally hermaphroditic guinea-pigs.—*D. D. Whitney.*

316. SEELINGER. Gewinnung samenbeständiger Sorten. [Producing varieties that come true from seed.] *Mitteil. Deutsch. Landw. Ges.* 36: 470-472. 1921.—The author states the problem with reference to small fruits, stone fruits, apples, and pears, discusses popularly the meaning of homo- and heterozygote, and gives briefly the usual methods of propagation. Since the stock influences the scion, it is desirable to develop a stock coming true from seed. The practical difficulties of keeping stock true are pointed out.—*A. J. Pieters.*

317. SEILER. [German rev. of: GOLDSCHMIDT, RICHARD. *Kleine Beobachtungen und Ideen zur Zellenlehre* II. Die Spermatogenese eines parthenogenetischen Frosches nebst Bemerkungen zur Frage, welches Geschlecht bei den Amphibien das heterozygotische ist. (Minor observations and ideas in cytology. II. The spermatogenesis of a parthenogenetic frog with comments on the question of which is the heterozygous sex in the Amphibia.) *Arch. Zellf.* 15: 283-290. 3 fig. 1920 (see *Bot. Absts.* 10, Entry 1707).] *Zeitschr. Indukt. Abstamm.- u. Vererb.* 27: 76-77. 1921.

318. SEILER. [German rev. of: GOLDSCHMIDT, RICHARD. *Kleine Beobachtungen und Ideen zur Zellenlehre*. III. Die Bedeutung der atypischen Spermatozoen. (Minor observations and ideas on cytology. III. The significance of atypic spermatozoa.) *Arch. Zellf.* 15: 291-300. 1920 (see *Bot. Absts.* 9, Entry 1334).] *Zeitschr. Indukt. Abstamm.- u. Vererb.* 27: 76. 1921.

319. SEILER, J. [German rev. of: NACHTSHEIM, HANS. *Zytologische und experimentelle Untersuchungen über die Geschlechtsbestimmung bei Dinophilus apatris* Korsch. (Cytological and experimental studies on the sex determination of *Dinophilus apatris*.) *Arch. Mikrosk. Anat.* 93 (Section 2): 17-140. 4 pl., 5 fig. 1919 (see *Bot. Absts.* 7, Entry 1837; 11, Entry 285).] *Arch. Zellf.* 16: 170. 1921.

320. SHAMEL, A. D. Bud selection in New Zealand. *California Citrograph* 6: 388. 1921.—The functions of the recently organized New Zealand Nomenclature Board include investigation of horticultural varieties, control of nomenclature, promotion of breeding (including "bud selection") of horticultural crops, and control of propagation from "selected fruiting trees of standard varieties of outstanding merit."—*Howard B. Frost.*

321. SHAMEL, A. D. Origin of the striped oleander. *Jour. Heredity* 12: 42-45. Fig. 29-31. 1921.—The author reports the occurrence of variegated oleanders (*Nerium oleander*) in California. The variegation consists of green-and-white or green-and-yellow-striped leaves, the pattern being irregular. These can be propagated by stem cuttings of variegated branches. Such branches are considered to have originated as bud-sports from normal green-leaved oleanders.—*E. W. Lindstrom.*

322. SHOWALTER, AMOS M. Chromosomes of *Conocephalum conicum*. *Bot. Gaz.* 72: 245-249. Pl. 4-5. 1921.—In this dioecious liverwort, dividing cells from thalli which had borne archegonia, and also from those with antheridia, showed 8 long chromosomes not all of the same length, and 1 short chromosome scarcely longer than broad. This short chromosome had not been noticed by the 4 previous investigators of this species. No differences in length were observed between the chromosomes of male and female plants.—*John Belling.*

323. SHULL, A. FRANKLIN. Chromosomes and the life-cycle of *Hydatina senta*. *Biol. Bull.* 41: 55-61. 6 fig. 1921.—The parthenogenetic eggs of the female-producing female are

found to have 12 chromosomes in the equatorial plate of the single maturation spindle. The parthenogenetic eggs of the male-producing female also have 12 chromosomes on the equatorial plate of the 1st maturation spindle; the chromosomes, however, are arranged in pairs. In the telophase there are only 6 chromosomes, which demonstrates that a reduction has taken place in the formation of the 1st polar body.—*D. D. Whitney.*

324. SHULL, GEORGE H. **Mendelian or non-Mendelian.** *Science* 54: 213-216. 1921.—Misunderstanding and controversy have arisen as to the exact meanings of "Mendelian heredity" and "Mendelism." The author's usage of the expression "Mendelian heredity" has always referred to cases such as Mendel observed in which there is independent segregation of unit factors during gametogenesis and chance recombinations at fertilization. On this basis, cases of linkage are considered non-Mendelian; but since strictly Mendelian inheritance and linkage are products of the same mechanism there is justification for a broader connotation for the term "Mendelian," making it essentially synonymous with chromosomal heredity as distinguished from cytoplasmic heredity. The author considers it time to abandon "Mendelian" and "non-Mendelian" as definite categories and to adopt more precise terms.—The relation of hereditary factors to linkage groups or to paired chromosomes must provide the basis for a classification of genetical phenomena into fundamental categories. Phenomena of chromosomal heredity may be distinguished from phenomena referred to extra-chromosomal bodies by use of the nouns *zeuxis* and *exozeuxis*, and the corresponding adjectives *zygous* and *exozygous*. Under *zeuxis* are to be noted 3 fundamental relationships of heredity factors according to whether 1 or more than 1 pair is involved, and whether the chromosomes involved are behaving in typical or atypical fashion. These categories may be named, respectively, *monozexis*, *pleiozexis*, and *anomozeuxis*, the corresponding adjectives being *monozygous*, *pleiozygous*, and *anomozygous*. Anomozeuxis is a composite of several phenomena of diverse nature. The relation of the 4 categories monozexis, pleiozexis, anomozeuxis, and exozeuxis to Mendelism in the strict sense is considered. Mendelian phenomena will be found in (1) all zygous monohybrids; (2) monozygous dihybrids, whenever crossing over equals or exceeds 50 per cent; (3) all pleiozygous dihybrids or polyhybrids, if no 2 factors in the series are monozygous with a frequency of crossing over lower than 50 per cent; (4) anomozeuxis under certain circumstances. Non-Mendelian phenomena will be found in (1) monozygous dihybrids whenever crossing over is less than 50 per cent; (2) most cases of anomozeuxis; (3) all cases of exozeuxis.—In *Oenothera*, where the question of Mendelian or non-Mendelian heredity has been most persistently raised: (1) Exozeuxis is probably concerned in inheritance of a variegation of the foliage; (2) anomozeuxis is illustrated by 15-chromosome forms, triploidy, tetraploidy, and probable fragmentation; (3) monozygous characters are *rubricatæ* bud pigmentation, intense reddening of stems, *nanella* stature, pink-coned buds, *sulfurea* flower color, 2 zygote "balanced" lethals, a factor for revolute leaves, and probably a pollen lethal; (4) *breristylis* factor, which seems to be inherited independently of all other known factors, probably represents in relation to these factors a case of pleiozeuxis. While genetical phenomena in *Oenothera*s, except variegated foliage, can be referred to chromosomes (*zeuxis*), yet independent segregation, hence typical Mendelian behavior, is so rare as to be almost negligible.—*E. B. Babcock.*

325. SLYE, MAUD, HARRIET F. HOLMES, and H. GIDEON WELLS. **Primary spontaneous tumors of the ovary in mice.** Studies on the incidence and inheritance of spontaneous tumors in mice. *Jour. Cancer Res.* 5: 205-226. 1920.—Among 22,000 mice of the Slye stock examined, 44 had spontaneous primary ovarian tumors. Of these 38 had simple solid papillary adenomas, of which a very small number were cystic. One mouse had a typical papillary cystoma and another a typical solid teratoma. The remaining 4 had malignant tumors of the ovary exhibiting the "mesothelioma" type of growth characteristic of malignant tumors derived from sex glands. All the mice with primary malignant tumor of ovary had tumors elsewhere, 2 having each 2 carcinomas of the mammary gland, 1 a single carcinoma of the mammary gland, and 1 a papillary adenoma of the lung. Among the 40 mice with benign ovarian tumors, 22 had tumors elsewhere, and frequently there were multiple tumors.—*Marg B. Stark.*

326. SMITH, KIRSTINE. Statistical investigations on inheritance in *Zoarcas viviparus* L. Compt. Rend. Trav. Lab. Carlsberg [Copenhagen] 14¹¹: 1-53. 1921.—The investigations concern: (1) Number of vertebrae; (2) number of pectoral fin rays; and (3) number of pigment spots in the part of the dorsal fin consisting of soft rays. The maternal correlation coefficients are found to be 0.398, 0.262, and 0.366, and the fraternal correlation coefficients 0.470, 0.353, and 0.350 for vertebrae, hard fin rays, and pigment spots, respectively, with probable errors about 0.01. The method indicated and applied for calculating the fraternal correlation coefficient requires that the number of sibs be the same for all fraternities considered. It does not involve any approximation, and the construction of fraternal correlation tables is avoided. —The numerical results are applied to the idea of *generative values* (introduced by Johs. Schmidt [see Bot. Absts. 11, Entry 314]), assuming that the investigation deals with whole sibs, which is considered probable. It is found that sibs with the same generative values may have different personal values.—*Kirstine Smith*.

327. SMITH, LOREN B. Notes on spinach breeding. Proc. Amer. Soc. Hort. Sci. 17: 146-155. 1920 [1921].—The methods used and plant characters considered in the production of a mosaic-resistant spinach at the Virginia Truck Experiment Station are discussed. The Manchuria, an Asiatic variety and the only 1 of many which showed any marked resistance to mosaic at the beginning of the experiment, was used to introduce the resistant factor. Hybrids resulting from Savoy and Manchuria crosses were later crossed with "round-leaf" and "thick-leaf" types to introduce other desirable characteristics. In going from F_1 to F_2 generation "selected stocks" showed a decrease in mosaic plants from 6.14=0.64 per cent. The ratio of mosaic-infected plants in the F_2 generation to those in the Savoy control was 1:4.35, in the F_3 generation, 1:16.37. The Manchuria and hybrid progeny are also less subject to aphid attack than other varieties.—Other factors desirable in commercial types are considered. "Size is determined largely by comparative measurements of the height and diameter of the mature plants. Savoying is measured by determining the increase which occurs in the leaf area due to this factor over that of a flat leaf of the same perimeter. Color is determined wholly by a system of scoring and comparison. Other factors, such as thickness of leaves, closeness, shape of leaves, long standing qualities, and growth, or character of foliage, are used in the determination of and improvement of type in spinach."—*H. A. Jones*.

328. STARK, M. B. A benign tumour in *Drosophila*. Proc. Soc. Exp. Biol. Med. 17: 51-52. 1919.—The author reports a new tumor appearing as a mutation in a strain of flies already showing lethal tumor in half the males. The new tumor differs from the lethal one in not being sex-linked or lethal. Linkage experiments show that at least 1 of the genes essential for tumor development is in the 3rd chromosome, closely linked to *dichaete*.—Tumor may occur in any segment of the larva, but is most frequent in the 12th and 13th. When it occurs in the thoracic region, the tumor cells may grow into the imaginal discs of the appendages, checking their development. Tumor cells are rounded or polygonal in shape and show pigment.—*E. E. Jones*.

329. STOCKARD, CHARLES R. A probable explanation of polyembryony in the armadillo. Amer. Nat. 55: 62-68. 1921.—In a series of experiments on fish eggs, Stockard has shown that by arresting development during the early cleavage stages double individuals and twins are frequently induced. The experiments indicate that lack of oxygen is the controlling factor and the author suggests that normal production of multiple embryos in the armadillo may be explained in the same way. It has been shown that the young blastocyst of the armadillo remains free in the cavity of the uterus for some time before implantation takes place. During this period the ovum is cut off from its oxygen supply and consequently remains in a state of "arrested development," which the author believes may explain the polyembryonic development.—*J. T. Patterson*.

330. STOUT, A. B. Sterility and fertility in species of *Hemerocallis*. Torreya 21: 57-62. 1921.—*Hemerocallis fulva* is not known to produce seed, but pollen of this species used with

H. flava gave viable seed; the reciprocal cross failed to mature seed. From the result of crossing *H. fulva* with *H. flava*, *H. Aurantiaca*, and *H. Thunbergii*, it appears that pollen and ovules of *H. fulva* are potent and are able to function in certain relations, but the compatibility in these combinations is of a weak grade. *H. flava* has both self-compatible and self-incompatible plants. *H. Thunbergii* produces some viable seed. It is thought that all plants of the single-flowered form of *H. fulva* may be descended by vegetative propagation from a single plant which happened to be self-incompatible. It is predicted that a search in the native home of the species will reveal plants which are compatible with strains which previously failed to produce seed. Seed production in *Hemerocallis* and similar plants depends on whether fertilization is compatible, and is not correlated with the development of the means of vegetative propagation.—D. F. Jones.

331. STRAND, E. [German rev. of: GOLDSCHMIDT, R. *Die quantitative Grundlage von Vererbung und Artbildung*. (The quantitative basis of inheritance and species formation.) 163 p., 28 fig. Julius Springer: Berlin, 1920.] Arch. Naturgesch. Abt. A. 86: 148, 1920 [1921].

332. SWINGLE, WALTER T., and T. RALPH ROBINSON. A new tangelo. The origin of a pink-fleshed citrus fruit by hybridization. Jour. Heredity 12: 151-153. 1 fig. 1921.—This fruit, more strictly a "tangelolo," was produced by 2 successive crosses, grapefruit \times (grapefruit or pomelo \times tangerine), the immediate pollen parent being the Sampson tangelo. The color of the pulp vesicles is a pale orange yellow, but that of "the lining membrane and partition walls is a reddish pink." The rind entirely lacks the pungent oil generally characteristic of the parent species.—Howard B. Frost.

333. TAMMES, TINE. Der blaublühende und der weissblühende Flachs und ihre Bedeutung für die Praxis. [The blue-flowered and the white-flowered flax and their practical significance.] Mittteil. Forsch. Inst. Sorau Verband Deutsch. Leinen-Indust. 2: 4 p. 1920.—The author recalls that before the war Gröningen grew blue flax and Friesland white and that Gröningen farmers frequently imported Russian seed, while Friesland farmers raised their own. "Degeneration" of the blue flax is attributed to its being a mixture and shorter, the more branched, less valuable elements of blue flax cultures gradually forming a greater percentage of the population due to a more abundant setting of seed. The white-flowered flax traces back to a single origin in 1816, and is more nearly a pure line. The advantage of blue-flowered pure lines is indicated. The occasional production of blues among whites is interpreted as due to the combining of complementary factors carried by different whites.—J. P. Kelly.

334. TCHOUPROFF, AL. A. On the mathematical expectation of the moments of frequency distributions. Part 2. Biometrika 13: 283-295. 1921.—This paper presents a mathematical analysis of the expectations of the moments of frequency distribution when the variates follow their own law of frequency and for the limiting case when the Laplace-Gauss law is followed.—John W. Gowen.

335. THATCHER, LLOYD E. A fungus disease suppressing expression of awns in a wheat-spelt hybrid. Jour. Agric. Res. 21: 699-700. 1 pl. 1921.—Infected F_2 hybrids between *Triticum vulgare* Vill. and *T. spelta* L. were grown in the greenhouse during the winter from seed treated with spores of *Tilletia foetans* (B. and C.) Trel.—Assuming a simple Mendelian ratio in which *AA* represents the plants of which all the grains of all the spikes were infected; *Aa*, those of which all the grains of part of the spikes were infected; and *aa*, those of which all of the grains of all of the spikes were free from infection, the mature plants fell into the following classification: 19 *AA*, 72 *Aa*, and 33 *aa*. Plants which were awned segregates of the class *Aa* showed normal development of the awns in the disease-free spikes and a suppression of awns in the diseased spikes.—A. N. Wilcox.

336. TONI, G. B. DE. Osservazioni biometriche intorno la *Calendula officinalis* L. in rapporto all' eterocarpie della specie. [Biometrical observations on *Calendula officinalis* L. with reference to the heterocarpie of the species.] Atti R. Inst. Veneto Sci. Lettere ed Arti 79: 1289-1460. 1921.—The author selected from a single plant 22 achenes of each of 4 different types,—“A,” “B,” “C,” and “D.” The progeny of the various types of achenes are classified in detail according to type and number of achenes per fruit. Types A and C are similar in behavior and are classed together. The progeny of any given type produces all 4 types of achenes. The frequency distribution of achenes per fruit is multimodal for the progeny of each type and is usually multimodal for each type of progeny.—*Hally J. Sax.*

337. TONI, G. B. DE. Sul comportamento degli acheni emiciclici della *Calendula officinalis* L. rispetto all' ereditarietà. [The hereditary behavior of the semi-circular form of *Calendula officinalis*. Preliminary report of new biometrical observations.] Riv. Biol. 2: 451-453. 1920.—Heterocarpie exists in *Calendula officinalis*. Two types of achenes, semi-circular and “naviculiform,” were found in a single plant. A comparison of the progeny of those 2 types shows a difference in distribution of achenes in fruits; the mode in the semi-circular type was 3, in the naviculiform type 4.—*Hally J. Sax.*

338. TSCHERMAK, ERICH VON. Bastardierungsversuche mit der grünsamigen Chevrier-Bohne. [Hybridization studies with the green-seeded Chevrier bean.] Zeitschr. Pflanzenzücht. 7: 57-61. 1919.—This is a report of experiments planned and executed for the purpose of improving the Chevrier bean. When harvested before completely matured and cured in the shade the cotyledons and seed coats are green. If over-ripe the chloroplasts are totally or partially destroyed, the seeds becoming yellow. Such seeds, however, give green-seeded sorts if the plants produced are harvested early and cured in subdued light.—Yellow-seeded varieties exist which are thought to differ from the green-seeded by 1 primary or directly acting factor pair, yellow being dominant to green. Of 1049 F₂ seeds yellows and greens were present in the ratio of 3.088 to 0.912. The author ascribes the excess of yellows to the effect of too strong light during the maturing season and to the action of a secondary or modifying factor of a catalytic nature. Correlation between green seedcoat and green pods is noted.—*C. B. Hutchison.*

339. URISCH, G. VON. Zur Genetik der trimorphen Heterostylie sowie einige Bemerkungen zur dimorphen Heterostylie. [On the genetics of trimorphic heterostyly and some remarks on dimorphic heterostyly.] Biol. Zentralbl. 41: 88-96. 1921.—In this interpretation of Barlow's data on inheritance of heterostyly in *Oxalis* and *Lythrum* [Jour. Genetics 3: 53-65. 1913], the author suggests genetic formulae for trimorphic heterostyled plants as follows: long = *aabb*, mid = *aabH* or *aabb*, short = *Aabb* or *AaBb*, assuming the effect of *A* to be greater than that of *B*. On this basis the ratios expected from the various intercrosses of the 3 are: long × short = 1 long : 1 short; long × mid = 1 long : 1 mid; mid × short = 1 long : 1 mid : 2 short; or 1 long : 3 mid : 4 short. The 1:1:2 ratio in the last case is assumed to occur when the generic constitution of the short-styled plant is *Aabb*, and the 1:3:4 ratio when it is *AaBb*. The occasional occurrence of a 3rd type in *Oxalis* crosses between long and short as well as between long and mid style, the writer is unable to explain on the basis of these formulae.—*P. Krakau.*

340. URIBANCO, LEOPOLDO B. Reproduction in the Aphididae with a consideration of the modifying influence of environmental factors. Psyche 28: 95-109. 1921.—The author reviews the general features of the aphid life-cycle and literature concerning the effects of environment. Some of his observations and reports of the life-cycle in tropical and other warm regions lead him to conclude that the occurrence of bisexual reproduction is rhythmical, that alterations of temperature do not at once destroy this rhythm, but that prolonged absence of cold weather eventually causes disappearance of oviparous forms (true sexes). Certain disagreements may thus be explained by assuming that some experimental stocks were collected in the wild, others from long-maintained greenhouse strains.—*A. Franklin Slat.*

341. VOSS, H. Die beiden Hauptfaktoren der traumatischen Parthenogenese. [The two chief factors of traumatic parthenogenesis.] *Biol. Zentralbl.* 41: 359-367. 1921.—As Bataillon and others have shown, frog eggs pricked with a fine needle begin to segment, but development does not proceed far unless the eggs were previously bathed with blood or lymph, or some liquid containing cells of other organs. The author attributes the effect of blood, etc., to the entrance of cells or parts of cells into frog eggs, carrying with them oxidative ferments. Normal fertilization is held to aid development by oxidases introduced by the sperm.—A. Franklin Shull.
342. VRIES, HUGO DE. The present position of the mutation theory. *Nature* 104: 213-214. 1919.—Difficulties inherent in the theory of natural selection led to the mutation theory, which presumes species and varieties to be produced by small but distinct changes. Initial mutational changes take place in sexual cells before fertilization. From this it follows that half-mutants are apt to be produced which may, in another generation, produce full mutants in a normal manner. Half-mutants may or may not be phenotypically distinct from the parents. If not distinct in the immediate generation they will commonly appear as 20 to 25 per cent of the offspring of the generation following; mass mutations are thus accounted for. Endemic species of the evening primrose and their mutants show a close parallelism to the age-area theory of Willis relative to land floras. Objections to the mutation theory are directed rather against special cases than against the theory in general.—L. R. Waldron.
343. WAARDENBURG, P. J. [Dutch rev. of: ANDRASSY, KARL. Ein Beitrag zur Vererbung der Katarakt. (Contribution to the inheritance of cataract.) *Klinische Monatsbl. Augenheilk.* 66: 568. 1921.] *Genetica* 3: 485-486. 1921.
344. WAARDENBURG, P. J. [Dutch rev. of: BARTH, FRITZ. Ein weiterer Beitrag zur Vererbung der familiären Sehnervenatrophie. (A further contribution to the heredity of familial atrophy of the optic nerve.) *Klinische Monatsbl. Augenheilk.* 66: 581. 1921.] *Genetica* 3: 486-487. 1921.
345. WAARDENBURG, P. J. [Dutch rev. of: BRONSON, E. On fragilitas ossium and its association with blue sclerotics and otosclerosis. *Edinburg Med. Jour.* April, 1917.] *Genetica* 3: 487. 1921.
346. WAARDENBURG, P. J. [Dutch rev. of: CONARD, H. S., and C. B. DAVENPORT. Hereditary fragility of bone. *Eugenics Rec. Office Bull.* 14. 1915.] *Genetica* 3: 488. 1921.
347. WAARDENBURG, P. J. [Dutch rev. of: ENGELHARD, C. F. Eine Familie mit hereditärem Nystagmus. (A family with hereditary nystagmus.) *Zeitschr. Gesamm. Neurol.* 28: 319. 1915.] *Genetica* 3: 490-492. 1921.
348. WAARDENBURG, P. J. [Dutch rev. of: FLEISCHER, BRUNO. Beiträge zur Vererbung von Augenkrankheiten. (Contribution to the heredity of eye diseases.) *Klinische Monatsbl. Augenheilk.* 66: 561. 1921.] *Genetica* 3: 493. 1921.
349. WAARDENBURG, P. J. [Dutch rev. of: FREYTAG, GUSTAV TH. Ueber blaue Sklera und Knochenbrüchigkeit. (Blue sclerotics and fragility of bones.) *Klinische Monatsbl. Augenheilk.* 66: 507. 1921.] *Genetica* 3: 493. 1921.
350. WAARDENBURG, P. J. [Dutch rev. of: CALLES. Sind die sog. "angeborenen" Retraktionsbewegungen des Auges die Folge einer Geburtsverletzung? (Are the so-called congenital retractive movements of the eyes due to injury at birth?) *Arch. Augenheilk.* 87: 102. 19—.] *Genetica* 3: 494. 1921.
351. WAARDENBURG, P. J. [Dutch rev. of: MÜCKE, RUDOLF. Ein Beitrag zur Vererbung der Retinitis pigmentosa. (Contribution to the heredity of retinitis pigmentosa.) *Klinische Monatsbl. Augenheilk.* 66: 562. 1921.] *Genetica* 3: 502. 1921.

352. WAARDENBURG, P. J. [Dutch rev. of: REIS, W. Ueber Megalocornea. (On megalocornea.) *Klin. Ophth.* 1920: 577. 1920.] *Genetica* 3: 506. 1921.

353. WAARDENBURG, P. J. [Dutch rev. of: ROWAN, J., and J. A. WILSON. Hereditary cataract. *British Jour. Ophth.* 5: 64. 1921.] *Genetica* 3: 506. 1921.

354. WAARDENBURG, P. J. [Dutch rev. of: SCHIÖTZ, I. Inheritance of colour blindness. *British Jour. Ophth.* 4: 345-359, 393-403. 1920 (see *Bat. Absts.* 11, Entry 311).] *Genetica* 3: 507. 1921.

355. WAARDENBURG, P. J. [Dutch rev. of: STÄHLI, J. Das Krankheitsbild des Keratokonus vom Standpunkte der Variabilitätslehre (mit zwei klinischen Beispielen von Familiarität des Keratokonus und einen Anhang mit Bemerkungen zur Myopiefrage). (The pathological aspect of conical cornea from the standpoint of the theory of variation (with two clinical cases of familial conical cornea and a supplement with notes on the question of myopia.) *Klinische Monatsbl. Augenheilk.* 62: 712. 1919.] *Genetica* 3: 508. 1921.

356. WAARDENBURG, P. J. [Dutch rev. of: TRITSCHELLER, L. Beitrag zur Vererbung der familiären Hornhautentartung. (Contribution to heredity of familial degeneration of the cornea.) *Klinische Monatsbl. Augenheilk.* 66: 57. 1921.] *Genetica* 3: 509. 1921.

357. WAARDENBURG, P. J. [Dutch rev. of: VOORHOEVE, N. Het ziektebeeld der blauwe sclerae in verband met andere erfelijke resp. aangeboren afwijkingen. (Pathological aspect of blue sclerae in connection with other hereditary or congenital variations.) *Ned. T. voor Gen.* 1: 1873. 1917.] *Genetica* 3: 511-512. 1921.

358. WAARDENBURG, P. J. [Dutch rev. of: ZORN, BERNHARD. Ueber familiäre atypische Pigmentdegeneration der Netzhaut (totale Aderhautatrophie). (Familial atypical pigment degeneration of the retina (complete atrophy of the choroid). *Arch. Ophth.* 101: 1. 1919.] *Genetica* 3: 414-416. 1921.

359. WAGER, HAROLD. The significance of sex and nuclear fusions in the fungi. *Trans. British Mycol. Soc.* 6: 305-317. 1920.—General principles and examples are given. Isogamy is considered only a morphological term; sexual characters of fusing gametes are diametrically opposite so that a zygospore is physiologically heterogamous in nature. Nuclei of fungi do not differ essentially from those of higher plants. It has been observed that the basidia of the Hymenomycetes contain 2 nuclei which fuse before sporidia formation. Sexuality is defined as "... essentially characterized by the association of two cells, each with its nucleus, and their fusion to form a zygote." The fusion is endogamous in most fungi having binary sexual fusions so that there can be no blending of 2 lines of descent, rejuvenescence being the only advantage secured. A definite physiological differentiation occurs when the sexual organs are formed. In the Uredineae, binary fusion has been replaced by a simpler type, endokaryogamy. It has been shown that the binucleate-cell condition arises by the fusion of 2 cells or the migration of a nucleus from 1 cell to another. The subsequent fusion of these nuclei and the reduction division are the significant phenomena in this type of fusion. Various stages of degeneration have been observed in the Ascomycetes. Normal fusion accomplishes 2 purposes.—blending of 2 lines of descent and rejuvenescence. If the former should become superfluous in low organisms, the latter could be accomplished by mere fusion of related nuclei. This may explain the simple nuclear fusion replacing binary fusion in higher fungi. [See also *Bot. Absts.* 8, Entry 1837.]—*Paul A. Young.*

360. WALDRON, L. R. A study of physical characters and some of their correlation in *Bromus inermis*. *North Dakota Agric. Exp. Sta. Bull.* 153. (*Res. Bull.* 2.) 82 pp. 5 figs. 1921.—Plants from 2 commercial lots of brome-grass from Canada and South Dakota were studied the 1st year from seed and found to be significantly different in several respects.

Pearson types of curves were fitted to the 2 series of observations. In height and weight studies for 3 seasons, after the 1st year of growth, height was found to increase from season to season, and maximum weight was indicated for the 2nd season. Variability of weight of plant increased from season to season. Correlation coefficients between height and weight were all significant but not high. The maximum coefficient was 0.513 ± 0.042 for 1917. In correlation studies of weight of plant, correlation was found to be comparatively high between immediately successive years but scarcely significant in years successive but 1. Correlation data indicate the Canadian group to include a comparatively larger proportion of poor plants compensated, at least in part, by inclusion of a certain number of better plants, than was found in the South Dakota group.—Studies were made upon percentage of sterile culmage found in selected plants through 3 seasons. Sterile culmage was found to be a distinguishing character with certain plants of *Bromus*; the presence of this would affect the economic value of the plant. Correlation studies indicate a negative correlation between total weight of plant and weight of sterile culmage.—*L. R. Waldron*.

361. WARD-CUTLER, D. The cytological problems arising from the study of artificial parthenogenesis. *Sci. Prog.* 16: 71-78. 1921.—This is a review of experiments on artificial parthenogenesis with special reference to sex-determination. Using Loeb's parthenogenetically produced frogs (both male and female), Delage's 1 sea-urchin (male), and Jack's female bees produced by workers, the author discusses possible modes of reconciling the results with the chromosome hypothesis of sex. The principal explanations suggested of females from such eggs are the absence of reduction, occurrence of non-disjunction, and duplication of chromosomes in later development. Production of both sexes in the case of the frog may be due to the effect of environment, since environment is known to alter the sex ratio. The author also discusses Herlant's work on physico-chemical initiation of development in artificial parthenogenesis.—*A. Franklin Skull*.

362. WENHOLZ, H. Methods of maize breeding for increase of yield. *Agric. Gaz. New South Wales* 32: 629-634. 1921.—Comparison is made between ordinary ear-to-row system of breeding and "selection in self-fertilized lines." Difficulties of the latter method are pointed out which would be especially hard to overcome unless sufficient time, space, and means were available. An ear-to-row method of corn-breeding is outlined, which is claimed to obviate certain disadvantages of the old systems. Results secured at different localities in different years with different varieties indicate that "stud seed" yielded on the average 20 per cent more than ordinary selected seed.—*L. R. Waldron*.

363. WESTERMEIER, KURT. Das Blattgrün als neuer Faktor in der Pflanzenzüchtung an der Hand von Untersuchungen an Weizensorten. [Leaf greenness as a new factor in plant breeding from the standpoint of investigations on wheat varieties.] *Zeitschr. Pflanzenzücht.* 8: 14-25. 1921.—Twenty-nine varieties of wheat, both winter and spring forms, representing all species, were observed during their vegetative periods and the leaf color recorded. The relationship of different shades of leaf color to rate and extent of growth and to yield and composition of kernel were determined. The association between leaf shades and rate and amount of growth differed in different species and in the same species at different stages. Kernel weight of the head, protein content, dry matter, and ash, considering the species, increased as color became deeper.—*C. E. Leighty*.

364. WETTSTEIN, FRITZ VON. Vererbungerscheinungen und Systematik bei Haplonten und Diplohaplonten im Pflanzenreich. [Genetical phenomena and taxonomy in haplonts and diplohaplonts in the vegetable kingdom.] *Zeitschr. Indukt. Abstamm.- u. Vererb.* 21: 233-246. 1919.—This is a consideration of the importance, both from the genetic and the taxonomic point of view, of genetical studies of plants whose vegetative life proceeds chiefly in the haploid condition. In higher plants the combinations of characters resulting from hybridization can not be determined until the development of the F_2 zygotes, while in the thallophytes multicellular gametophytes replace the morphologically undifferentiated sex

nuclei of higher plants. Furthermore, since in purely haploid plants the only zygotic nuclear division is a reductional one the distribution of characters must occur at this time. Thus further proof of the chromosome theory is obtained. These theoretical considerations have been partially proved by the experiments of Burgeff on *Phycomyces* and of Pascher on *Chlamydomonas*. It is pointed out that the taxonomist of thallophytes must keep in mind the fact that he is dealing with very great polymorphisms due not only to the variable nature of the haploid vegetative phase as influenced by environment but also by the regular occurrence of diplo- and visible haplo-combinations.—*P. Krakan*.

365. WHITING, P. W. Studies on the parasitic wasp *Hadrobracon brevicornis* (Wesmael). I. Genetics of an orange-eyed mutation and the production of mosaic males from fertilized eggs. Biol. Bull. 41: 42-54. 1921.—The author's previous work had shown that in this species fertilized females produce both male and female offspring, but unmated females have only sons. The present paper describes a recessive mutant eye-color, orange. Wild-type eye-color is black. Crosses show that black is dominant, but males resemble the mother, regardless of the nature of male to which she is mated, as is to be expected since males are presumably due to parthenogenesis. Orange females mated to black males resulted in 999 black females, 1334 orange males, and 57 black males. The 57 black males in this mating are the only observed exceptions to what the author calls "sex-linkoid" inheritance of orange. Twelve of the exceptional black males were tested by mating to orange females, and 7 of these produced only orange daughters. An orange-eyed male was also found that produced only black daughters. These 8 males are thus mosaics. All of them (and all other males tested) bred as though haploid for the orange locus, i.e., none produced both black and orange daughters when mated to orange females. The exceptional males must all have developed from fertilized eggs.—*A. H. Sturtevant*.

366. WILSON, E. B., and T. H. MORGAN. Chiasmatype and crossing over. Amer. Nat. 54: 193-219. 8 fig. 1920.—This is a discussion of 2 recent papers by Janssens [Compt. Rend. Soc. Biol. Belg. 917-920, 930-934. 1919]. In Part I of the present paper Wilson discusses the chiasmatype theory in connection with the cytological studies of Wenrich, Robertson, and others, and concludes that cytological evidence is not convincing in favor of Janssens' chiasmatype theory, though there is no cytological evidence inconsistent with the idea of an interchange of parts between homologous chromosomes some time during the maturation process, such as is indicated by the genetic evidence. In Part II Morgan discusses the genetic aspects of the question, suggesting several possibilities as to the mechanism of crossing over. He specially emphasizes the possibility of harmonizing some of the cytological and genetic observations by the supposition that, as the 4-strand chromosomes separate after synapsis, the beginning separation-plane is always reductional.—*A. H. Sturtevant*.

367. WINTERS, A. Y. Eugenics, the war instinct and democracy. Jour. Heredity 10: 254-256. 1919.—In the form of a letter the writer raises tentative objections to some of the suggestions made by recent writers in the Journal on the above subjects. His remarks apply chiefly to articles by Alleyne Ireland.—*Howard J. Barker*.

368. WRIEDT, CHR. Breeding earless sheep. Jour. Heredity 12: 56. 1921.—The author, referring to a paper by Ritzman [see Bot. Absts. 8, Entry 1908] on the inheritance of ear-length in sheep, calls attention to the fact that similar results were reported by himself in 1918. Also, he gives further evidence supporting the theory that short-eared sheep are heterozygous and earless sheep homozygous.—*Heenan L. Esau*.

369. YATSU, NAOHIDE. On the changes in the reproductive organs in heterosexual parabiosis of albino rats. Anat. Rec. 21: 217-228. 7 fig. 1921.—By methods not stated, the circulation of a male rat was united with that of a female, 24 successful pairs being produced. Neither the testis nor prostate was affected, but retrogressive changes in the ovary, such as occur in normal females, were accelerated, though corpora lutea were produced and, in 1 case,

young. The uterus was nearly normal. Fourteen cases of females parabiotic with castrated males were successful. Corpora lutea were not produced and the other retrogressive changes very much accelerated. The uterus became hydropic. The union of spayed females to normal males was without effect upon the testis.—*H. D. Goodale*.

370. ZADE. Die Versuche über Klee- und Gräserzüchtungen des landwirtschaftlichen Institutes Jena. [Experiments in clover and grass breeding at the Jena agricultural institute.] Jahrb. Deutsch. Landw. Ges. 1918: 139-150. 1918.—Methods of procedure are given, and brief statements to the effect that equally poor sets of seed were obtained from enclosed plants and from vegetative progeny of isolated enclosed plants. Breeding grass for greater food value through increased foliage is favorably considered. [From anonymous abstract in Zeitschr. Pflanzenzücht. 6: 197. 1918.]—*J. P. Kelly*.

HORTICULTURE

J. H. GOURLEY, *Editor*

H. E. KNOWLTON, *Assistant Editor*

(See also in this issue Entries 25, 29, 98, 145, 200, 244, 267, 305, 316, 320, 321, 327, 332, 450, 564, 594, 619, 625, 629, 741, 758, 859, 865)

FRUITS AND GENERAL HORTICULTURE

371. ANONYMOUS. Fruit crop report, October, 1921. Jour. Dept. Agric. Ireland 21: 327-335. 1921.

372. ALLEN, W. J. Orchard manuring experiments at Bathurst. Agric. Gaz. New South Wales 32: 496. 1921.—Soil at Bathurst is still sufficiently rich for fruit growing without manure. The rainfall is sufficient.—*L. R. Waldron*.

373. BATCHELOR, L. D. Walnut culture in California. California Agric. Exp. Sta. Bull. 332. 142-217. 1921.—General directions are given for walnut culture in California. Length of life and time of profitable bearing of young walnut trees are considered. Climatic factors of importance are frost and excessive heat; soil factors are primarily depth and character of the soil, drainage, and alkali. The water supply is considered chiefly from the standpoints of available rainfall, and amount and quality of irrigation water.—Six varieties of walnut trees are described, and the choice of rootstocks, propagation, and requirements of good nursery trees are discussed. Practical suggestions are made as to laying out the orchard, care of trees before planting, planting of young orchards, training young trees, and values of orchards and lands. Culture of the orchard is considered under the following headings: (1) Soil management; (2) cover-cropping; (3) irrigation; (4) intercropping; (5) fertilization; (6) pruning.—The following insects or disease pests are discussed: (1) Codling moth and aphids; (2) red spider; (3) walnut blight; (4) Melaxuma; (5) winter-injury or die-back. Methods of harvesting, curing, and packing the nuts are described and an idea is given regarding cost of production and reasonable income.—*A. R. C. Haas*.

374. BEVAN, W. The effects of irrigation on olive production in Tunisia. Cyprus Agric. Jour. 16: 50-51. 1921.—In 1 experiment extending over a period of 3 years, the average annual yield of olives from 2000 trees was 13 kgr. per tree from watered trees, and 4-6 kgr. per tree from 3,500 unwatered ones.—*W. Stuart*.

375. BROWN, GORDON G. Hood River apple orchard management with special reference to yields, grades and value of fruits. Oregon Agric. Exp. Sta. Bull. 181. 36 p., 7 fig. 1921.—The survey included 51 orchards covering a wide area typical of the Hood River Valley. Data are given covering a 6-year period (1913-1918), which was divided into 2 sub-periods or epochs

(1913-1915 and 1916-1918). During the 1st epoch the orchards were clean cultivated, during the 2nd cover crops such as alfalfa and clover were used. The factors studied include pruning, thinning, propping, tillage, irrigation, spraying, and fertilizer practices, all considered with reference to net results. The author emphasizes the fact that this is not a cost-of-production study. The intent of the survey as a whole is to standardize orchard management. In summarizing the author points out that high or low standards of success are closely related to differences in management.—*C. E. Owens.*

376. BUNYARD, EDWARD A. *A handbook of hardy fruits.* 205 p. *Illus.* John Murrey: London, 1921.—“This handbook, the result of a wide practical experience of fruit growing, gives in handy form full and accurate descriptions of all varieties of apples and pears in general cultivation in this country [England].”—*J. H. Gourley.*

377. CHEVALIER, AUG. *Recherches sur les Amygdalées et les pommiers des parties froides de l'Indo-Chine et du sud de la Chine.* [Research on the peaches and apples of the colder regions of Indo-China and southern China.] *Compt. Rend. Acad. Sci. Paris* 170: 1127-1129. 1920.—This is a report of the attempt to improve the varieties of pomaceous and prunaceous fruits of these regions by crossing and grafting the native species with varieties of known value. The following are found wild: *Persica vulgaris*, *Cerasus Puddum*, *Malus Doumeri*, and *M. laosensis*. Those cultivated are: *Persica nana*, *Amygdalus Davidiana*, *Prunus triflora*, *P. Mume*, *Malus prunifolia*, and *M. Rehder*.—*C. H. Farr.*

378. CRUESS, W. V. Some factors affecting the quality of ripe olives sterilized at high temperatures. *California Agric. Exp. Sta. Bull.* 333. 231-234. 1921.—Properly pickled olives yield an acceptable product when sterilized at 240°F. for 40 minutes. Very ripe olives are more liable to damage at 240°F. than less mature fruit, Manzanillo olives, particularly, should not be too ripe when pickled. The Manzanillo olive is more subject to damage in flavor and texture at 240°F. than the Mission, Sevillano, and Ascolano varieties. Brines of sufficient strength to prevent decomposition should be used for holding solutions. Brine of 5 per cent salt (20° salometer) is recommended for shipment, and brine of 10 per cent salt (40° salometer) for holding olives in the factory for long periods. Lye treatment must be thorough and all bitterness removed if the best flavor and texture are to be obtained in olives sterilized at 240°F. Fermentation and bacterial action in the pickled fruit cause “floaters” and pitting of the fruit; long storage of pickled fruit in dilute brine should therefore be avoided. Storage of the fruit in strong brine or water makes the texture of the fruit firmer. Acidified brines act vigorously on the tin plate and impart an undesirable flavor to the fruit. Olives retain their color more satisfactorily in lacquered than in plain cans. The scorched flavor noted in most olives immediately after sterilization at 240°F. rapidly diminishes during storage.—*A. R. C. Haas.*

379. DADANT, C. P. Bees and grapes again. *Amer. Bee Jour.* 61: 368. 1921.—The fact that honey bees do not puncture grapes is emphasized.—*J. H. Lorell.*

380. FRAPS, G. S. The chemical composition of Texas honey and pecans. *Texas Agric. Exp. Sta. Bull.* 272. 9 p. 1921.—This reports a chemical study of honey and pecans, 2 important Texas products.—*J. H. Lorell.*

381. GLENN, L. C. Experiments in hastening the germination of peony seed. *Bull. Peony News* 12. 19-22. 1920.—The author's conclusion from experiments in soaking for varying periods in hydrochloric, nitric, or sulphuric acid is that “treatment of very dry peony seed with strong sulphuric acid for an hour or somewhat more is an efficient and practical means of hastening germination.”—*A. P. Saunders.*

382. HARVEY, E. M., and A. E. MURNEEK. The relation of carbohydrates and nitrogen to the behavior of apple spurs. *Oregon Agric. Exp. Sta. Bull.* 476. 47 p., 12 fig. 1921.—

This report covers 2 phases of a series of fruit spur studies on the relation of nutritional changes in fruit trees to behavior and cultural practices. The first, *Effect of Spur Defoliation on the Formation of Fruit Buds*, by Harvey, seeks to determine to what extent the leaves of the individual apple spur control its metabolism as reflected in the relation of carbohydrates and nitrogen and the formation of fruit buds. About 7000 spurs of the varieties Jonathan, Wagener, and Grimes were used. Defoliation strongly hindered fruit bud formation and modified the normal chemical composition so that the defoliated spurs contained (1) more water and less soluble solids (?), insoluble solids, and total solids; (2) more nitrate nitrogen, total soluble nitrogen, and insoluble nitrogen; (3) more reducing sugars, total sugars (?), and less of the hydrolyzable polysaccharides and total carbohydrates; (4) smaller values of the carbohydrate nitrogen ratio. Although the results of defoliation indicate a rather high degree of individuality of the spur it is pointed out that the conception of spur individuality should not be carried too far since defoliated spurs were able to carry on approximately 50 per cent of their normal fruit-bud formation.—The second, *Effects of Spur Defoliation on the Setting of Fruit*, by Murneek, concerns the influence of unfolding leaves of the individual apple spur on the setting and development of fruit on the spur. A total of 3,200 spurs of each of the varieties Jonathan, Wagener, and Grimes were used. The conditions studied were: (1) Complete defoliation; (2) all but 1 leaf removed; (3) all but 2 leaves removed; (4) no leaves removed; (5) no leaves removed, but defoliated. The results show that setting of fruit in the apple is correlated with the amount of leaf area on the spur. The number of fruits set is proportional to the amount of defoliation. In a few instances fruit set on completely defoliated spurs, thus showing that the spur obtains considerable nourishment from the tree as a whole. Defoliation affected the chemical composition of the spurs as follows: (1) Total solids decreased; (2) no apparent effect was noted in soluble sugars, including reducing sugars and sucrose; (3) hydrolyzable polysaccharides increased with the reduction of leaf area; (4) total nitrogen decreased in proportion to defoliation; (5) defoliation caused a rather consistent increase in the value of the carbohydrate-nitrogen ratio.—*E. M. Harvey and A. E. Murneek.*

383. KRUG, O., und G. FIESSELMANN. *Die Weinernte 1920 in der Pfalz.* [Vintage of 1920 in the Palatinate.] *Zeitschr. Untersuch. Nahrungs- u. Genussmittel* 41: 127-131. 1921.—The unfavorable climatic conditions of the autumn of 1919 and of the grape-growing season of 1920 are described. *Peronospora* and *Oidium* gave considerable trouble, especially where spraying and sulphuring were not done early and thoroughly, and insects caused considerable damage in spite of treatment with nicotine and urania-green. The harvest was $\frac{1}{2}$ – $\frac{2}{3}$ normal. Analytical tables are given showing alcohol and free-acid percentages of a number of samples of red and white musts. The year may be considered fairly successful in spite of pests and rising costs. Sulphur, especially colloidal sulphur, against *Oidium* is considered deserving of further investigation.—*E. E. Stanford.*

384. McDONALD, A. H. E. *The cultivation of hops.* *Agric. Gaz. New South Wales* 32: 712. 1921.

385. OVERHOLSER, E. L., and R. H. TAYLOR. *Ripening of pears and apples as modified by extreme temperatures.* *Bot. Gaz.* 69: 273-296. 1920.—When contrasted with temperatures between 70 and 85°F., temperatures between 87 and 110° cause an appreciable delay in ripening of green 1st crop Bartlett pears, the retardation being directly proportional to the temperature within these limits: toward the upper limits a retardation of 13 days was effected. Second crop Bartlett pears, at a temperature of 101°F. and a relative humidity of below 50 per cent, remained unripe 4 weeks after similar pears had become fully ripe at room temperature and humidity. It is suggested that these results may be due to a reduction of enzymatic activities at temperatures above 85°F. as well as at low temperatures. Unripe Easter pears behaved like Bartlett pears, but ripening of yellow Newtown apples is not retarded at high temperatures.—*H. C. Coules.*

386. POPENOE, WILSON, and OTÓN JIMENEZ. **The pejibaye, a neglected food-plant of tropical America.** Jour. Heredity 12: 154-166. 6 pl. 1921.—An account is given of the pejibaye, the starchy fruit of the palm *Guilielma utilis* Oerst., which forms a staple foodstuff of the natives of the lowlands of Colombia, Ecuador, and Venezuela, and has long been cultivated by the Indians of Costa Rica. A detailed description of the palm is given, with notes on flowering and a description of the fruits, which are borne in huge racemes and are individually nearly 2 inches in diameter. The maximum production of 1 palm is about 150 pounds of fruit, which compares well with that of the date palm. In food value the pejibaye ranks well among tropical fruits. It is eaten boiled, having then a fine chestnut-like flavor. The cultural requirements are tropical, and propagation is chiefly by seeds. The writers recommend the cultivation of this palm throughout tropical regions.—P. C. Russell.

387. RICE, W. H. **Fruit cool storage.** New Zealand Jour. Agric. 22: 25-33. 1921.—This is a 2nd report on the effect of maturity and methods of handling upon the keeping quality of various fruits in cold storage.—N. J. Giddings.

388. ROOT, A. I. **Blueberries and huckleberries under cultivation.** Gleanings from Bee Culture 49: 514-516. 2 fig. 1921.

389. ROOT, A. I. **Blueberries in New Jersey, Florida and Alabama.** Gleanings from Bee Culture 49: 652-653. 1921.—This is a brief account of the progress recently made in the cultivation of blueberries.—J. H. Lovell.

390. WARD, J. M. **Annual report of the fruit expert and chief of fruit division.** Rept. Agric. and Stock Dept. Tasmania 1920-21: 15-18. 1 pl. 1921.—Spraying experiments for the control of codling moth and "mussel" scale are reported. Standardization and grade standards are discussed. Tasmanian growers wish to have color-grading eliminated. Statistics are presented on the production and shipment or other disposition of the fruit crop. Two million cases of fresh fruit were shipped during the year. The unsatisfactory condition of the state apple orchard is attributed to unsuitable locality, to poor soil, and to an "unsuitable stock, i.e., Northern Spy."—D. Reddick.

391. WEBBER, H. J. **The improvement of root-stocks used in fruit propagation.** Jour. Heredity 11: 291-299. 4 fig. 1920.—In this outline of experiments and study of stocks for varieties of *Citrus*, consideration of stocks is usually limited to discussion of species groups, disregarding the fact that individuals within a group are extremely variable. In some citrus orchards trees are reasonably uniform, in others they vary greatly in habit of growth and fruiting. Normally grown 2-year old nursery trees vary greatly in size, but all are sold and planted. A nursery at the Citrus Experiment Station (California) was planned to produce as uniform trees as possible. Sweet seedling stock was selected and all small trees discarded. Buds from record trees of standard type were used. The usual degree of variation in the trees after 2 years led to a test of sizes of nursery trees, the varieties used being Valencia and Navel oranges, Marsh Seedless grape fruit, and Eureka lemon. For each variety 18 trees in each of the 3 groups, large, intermediate and small, were planted in orchard rows for comparison. At 5 years of age, after 3 years in the orchard, the trees retained the differences in size as markedly as when transferred from the nursery. Eliminating soil, nutrition, bud-union, and injury to roots, and assuming that the buds from record trees would be uniform, it is concluded that the only other factor likely to cause variation is the stock used. A further test of variation in seedling stocks was made by selecting, in a nursery, 16 sour orange seedlings showing different characters and 4 types of sweet seedlings. Two sour orange stocks were budded from each of the selected seedlings. At 5 years from the bud all the types selected showed marked differences in size and other characters. Available evidence points to the conclusion that differences in the seedling stocks used are responsible for the differences in size of the nursery trees. The author does not regard the evidence as complete, but believes results of the experiments warrant the following changes in nursery practice: (1) To discover sweet

orange and sour orange varieties known to produce good stock seedlings, and to name and establish these as stock varieties. Such varieties should be planted in isolated places to prevent crossing with other varieties; (2) to discard all small seedlings when shifting from seed-bed to nursery; (3) to inspect the nursery before budding and eliminate all inferior seedlings; (4) only vigorous budded trees should be used for the orchard. Evidence is also given to show that what has been found true regarding citrus stocks applies as well to apple and other fruits.—*C. S. Crandall.*

392. WHEELER, EVERETT P. Another method of hastening germination. *Bull. Peony News* 12. 23. 1920.—The author found that by sowing seed as soon as ripe, wetting thoroughly, and taking special precautions against drying out, e.g., by covering with wet burlap, a germination as high as 50 per cent was obtained the following spring. Peony seed under ordinary garden conditions usually requires an additional year for germination.—*A. P. Saunders.*

393. WRIGHT, JOHN. Profitable fruit growing. 11th ed., 132 p., 53 fig. W. H. & L. Collingridge: London, 1921.

FLORICULTURE AND ORNAMENTAL HORTICULTURE

394. ANONYMOUS. Old garden flowers. *Amer. Bot.* 27: 121-124. 1921.—A brief account is given of the wild species of *Aquilegia* (columbine).—*S. P. Nichols.*

395. ANONYMOUS. The cultivation of lavender for market. *Gard. Chron.* 70: 7. 1921.—Brief cultural directions are given. A yield of 1200 pounds of partially dried flowers giving 25 pounds of oil is obtained from an acre of land under favorable conditions. In 1920 distillers paid £40 to £100 per ton for flowers.—*P. L. Ricker.*

396. ARNOLD, W. S. Passion fruit. *Agric. Gaz. New South Wales* 32: 677-678. 1921.—Notes are given on varieties, methods of culture, and economic returns of the fruit of *Passiflora edulis*.—*L. R. Waldron.*

397. BROWN, N. E. History of *Aloe spicata*. *Gard. Chron.* 70: 6. 1921.—This plant commonly cultivated in gardens, was described by Linnaeus (Suppl. 205. 1781) from a specimen collected by Thunberg in South Africa. The original description is too brief for identification but Thunberg (Diss. Aloe, 4. 1785, and Fl. Cap. ed. Schultes. 309) gives a very good description. He does not mention gum-aloes being obtained from the plant but does mention the juice. Willdenow and Kunth knew the plant only from the above cited descriptions; even the exact locality where it was collected is unknown except that it was in "the interior region." As Thunberg describes the ripe capsule, possibly he saw the plant in September and so stated that it flowered in August. Thunberg's route during Sept., 1772 is given and it is suggested that the plant be searched for in these localities. The figure in Bentley and Trimen's Medicinal Plants, plate 284, was made from a plant from Abyssinia now known as *A. eru* Berger; the description in Flora Capensis as to flowers was made from the same, but as to leaves from a plant probably native of South Africa.—*P. L. Ricker.*

398. CROMELIN, L. M. Trees and shrubs for the home grounds. *Amer. Forest.* 27: 439-444. 16 fig. 1921.

399. DILLSTONE, GEORGE. The Bartley Freesias. *Gard. Chron.* 69: 147. 1921.—Some of G. H. Dalrymple's Freesias, shown at Vincent Square, are described and classified.—*P. L. Ricker.*

400. DYKES, W. P. Irises of the future. *Gard. Chron.* 69: 258. 1921.—There seems little hope of new developments in early bulbous Irises unless the fungous diseases of the bulbs can be held in check. Suggestions, which should prove valuable, are made for series

of crosses in each Iris group. The development of Spanish Irises will be retarded until a remedy for the eelworm in the soil is found. This is also a serious pest in the Narcissus.—*P. L. Ricker.*

401. GROVE, A. **Lilies in 1920.** *Gard Chron.* 70: 62-64. *Fig. 25-26.* 1921.—Previous to 1919 there were several disappointing seasons and even 1919 was not an entire success on account of ravages of *Botrytis* in June and July. The merits of *Lilium regale*, *L. sargentiae*, *L. formosum*, *L. myriophyllum*, *L. brownii*, *L. willmottiae*, *L. thayerae*, *L. roezlii*, *L. philippinense*, *L. ochraceum*, and a few others, some not specifically named, are discussed and suggestions given as to the treatment of some that have given trouble in cultivation.—*P. L. Ricker.*

402. JACKSON, T. P. **Hybrid Bougainvilleas.** *Agric. News [Barbados]* 20: 186. 1921.—This short note describes some new Bougainvilleas obtained by hybridisation at the Botanic Station, St. Vincent, West Indies. It is hoped material of these plants will be available for distribution to other botanical establishments.—*J. S. Dash.*

403. JACOB, JOSEPH. **Dutch Irises.** *Gard Chron.* 70: 15. *Fig. 5.* 1921.—This race of Iris originated in Holland and first appeared in commerce at the beginning of the last decade. It has a general resemblance to Spanish Irises such as Flora and Rossini, but is larger and comes into bloom 10-14 days earlier. The original strain of van Tubergren was produced by intercrossing 2 early flowering forms of *I. ziphium*, viz., *filifolia (praecox)* and *lusitana* and later by introducing *tingitana* blood. A list of the best 12 varieties is given and notes on a number of others.—*P. L. Ricker.*

404. JACOB, JOSEPH. **The Wrexham Delphiniums.** *Gard Chron.* 70: 71. 1921.—Notes are given on varieties at the Royal Horticultural Show exhibited by W. E. Samuel.—*P. L. Ricker.*

405. MULFORD, F. L. **Oaks for ornamental planting.** *Amer. Forest.* 27: 461-467. 16 *fig.* 1921.

406. MULFORD, F. L. **Perennials.** *Amer. Forest.* 27: 589-594. 4 *fig.* 1921.

407. NEAL, JOHN. **Indoor plants—Exacum macranthum and E. affine.** *Gard. Chron.* 69: 189. *Illus.* 1921.—Descriptions and culture of the 2 species are given, and a figure of *E. affine*.—*P. L. Ricker.*

408. PROSCHOWSKY, A. ROBERTSON. **Palms of the Riviera.** *Gard. Chron.* 69: 198-199. 1921.—Two species of *Erythra* (related to *Washingtonia* and usually passing under the name *Bravia*) are common, viz., *E. armata*, the blue-palm (also called *Bravia roezlii*), and *E. edulis*, both natives of Lower California. Two other species, *E. brandegeei* and *E. elegans*, of Lower California and Sonora respectively, are as yet rare in gardens. The first 2 species are briefly described.—*P. L. Ricker.*

409. PROSCHOWSKY, A. ROBERTSON. **Palms of the Riviera.** *Gard. Chron.* 69: 211-212. 1921.—*Bravia dulcis* and *B. calcarata (B. nitida)* are described.—*P. L. Ricker.*

410. ROIDE, ELEANOR SINCLAIR. **A garden of herbs.** ix + 232 p., 14 *fig.* Philip Lee Warner: Boston, 1921.—A list of authorities is included.—*J. H. Gourley.*

411. SAUNDERS, A. P. **A study of Hollis's catalogues and a list of his seedlings.** *Bull. Peony News* 10. 6-43. 1920.—This is a detailed study of all peonies introduced by Hollis, with statistics regarding their distribution among peony growers.—*A. P. Saunders.*

412. SAUNDERS, A. P. **How to hybridize peonies.** Bull. Peony News 8. 19-24. 1919.—The methods and instruments used by the writer in cross-fertilizing are described, and notes given on the behavior of individual varieties.—A. P. Saunders.

413. SAUNDERS, A. P. **Symposium on a general list of peonies.** Bull. Peony News 7. 22-46. 1919.—This symposium gives the votes of the members of the Peony Society as to the merits of all Chinese peonies known in American commerce. With 1 or 2 exceptions, all the best sorts are introductions of the last 10-20 years. The object of the symposium is to furnish a guide to amateur and professional growers in selecting the best kinds for private collection or for propagation for commerce. The 3 varieties attaining an average above 9.5 (on a scale of merit from 1 to 10) are: Le Cygne (Lemoine), Solange (Lemoine), and Thérèse (Dessert). The average was 9.7 for each of the 3, based on 23, 23, and 32 votes respectively. [See also following entry.]—A. P. Saunders.

414. SAUNDERS, A. P. **Symposium on the general list of peonies.** Bull. Peony News 14. 3-41. 1921.—The purpose of this symposium is to obtain the consensus of opinion of peony growers on the merits of all varieties of Chinese peonies in cultivation in America. The results for nearly 700 varieties are given. Discontinuance of 111 varieties, all of which received an average of 6 or less on a scale of 10, is recommended by the directors of the Society. The varieties ranking above 9.5 on a number of votes sufficient to give a probably permanent estimate of merit are: Le Cygne (Lemoine), Kelway's Glorious (Kelway), Thérèse (Dessert), and Solange (Lemoine). An American seedling, Mrs. Edward Harding (Shaylor), received an average of 9.9, but upon 13 votes only. The results of the symposium are discussed from several points of view. [See also preceding entry.]—A. P. Saunders.

415. WARD, F. N. **Horticulture.** Agric. Gaz. New South Wales 32: 658-660. 1921.—The article discusses suitable trees for avenue planting and, more generally, trees suitable for planting in the vicinity of Sydney.—L. R. Waldron.

416. WARD, F. N. **Horticulture.** Agric. Gaz. New South Wales 32: 748-751. 1921.—Some 50 species of trees, native and introduced, are recommended for planting for the various districts of the Province.—L. R. Waldron.

417. WARD, F. N. **The cultivation of lavender.** Agric. Gaz. New South Wales 32: 795. 1921.

418. WISTER, J. C. **Notes of a traveller.** Bull. Peony News 9. 32-43. 1919.—Notes by an expert peony grower on visits to the Paris and London Flower Shows and to the nurseries of Lemoine at Nancy and of Dessert at Chenonceaux are given.—A. P. Saunders.

419. WISTER, J. C. **Visits to European iris gardens.** Bull. Peony News 11. 6-33. 1920.—These notes, by an authority on Iris culture who visited the grounds of all the leading Iris growers in France and England, are particularly concerned with the relative merits of the newer introductions.—A. P. Saunders.

VEGETABLE CULTURE

420. ALEXANDER, W. **Value of cultivation in root crops.** New Zealand Jour. Agric. 22: 44-45. 2 fig. 1921.

421. BAILEY, L. H. **The principles of vegetable gardening.** 18th ed., re-made and re-set. xiii + 499 p., 352 fig. MacMillan Co.: New York, 1921.—The term "vegetables" is restricted to oleraceous or esculent herbs. The substitution of the term olericulture is not recognized as desirable. "This book deals primarily with the gardening phase of the subject, as its title indicates, for horticulture ends at the factory door."—A list of 247 plants includes 114 as herbage vegetables, 59 root vegetables, and 74 fruit vegetables.—A distinction is made

between the commercial phases of gardening known as market-gardening and truck-growing. "The former is the growing of a wide or general range of vegetables by intensive methods near the city, so near that the producer may perhaps drive to the market. The latter is the growing of a few specialties on cheaper land by more extensive methods at some distance (often a great distance) from the cities, depending on the long haul by water or rail." Growing of the following is discussed: Asparagus; rhubarb; artichoke; girasole; sea-kale; dock and sorrel; udo; spinach and other greens; cole crops (cabbage family); salad crops (lettuce, endive, cress, corn salad, parsley, salad chervil, and celery); bulb or onion crops; root crops (beet, radish, turnip, rutabaga, horse radish, carrot, parsnip, celeriac, turnip-rooted chervil, skirret, salsify, scorzonera, and scolymus); potato crops; peas and beans; solanaceous fruits (tomato, egg-plant, pepper, and husk tomato); cucurbits; sweet corn, okra and martynia. Other chapters treat of glass; hot-beds; the land and its treatment; vegetable-gardening tools and implements; seeds and seedage; and additional features of management of the garden, such as weeds, insects and fungi, marketing, storing, and drying, and suggestions for the home garden.—*J. H. Gourley.*

422. DARNELL-SMITH, G. P. Propagating mushrooms from natural spawn. *Agric. Gaz. New South Wales* 32: 490. 1921.

423. DURHAM, GEORGE B. Growing tomatoes by tip-cuttings. *Jour. Heredity* 12: 40-41. 1921.—Plants grown from forced buds in the axils of the leaves of the Comet variety of tomatoes exceeded in production and earliness seedlings of Noroton and Farquhar's Bountiful varieties. A 2nd bud generation gave reduced yields and a 3rd still smaller yields, though the 1st ripened in a much shorter period. It was found that although the total production and size of the plants decreased nearly 50 per cent each generation, the average number of fibro-vascular bundles was not reduced.—*J. H. Kempton.*

424. ORTON, W. A. Vegetable problems in diabetic diets. *Amer. Jour. Med. Sci.* 161: 498-509. 1921.—The author enumerates vegetables grown in other countries but not common in the U. S. A. which may be used to diversify the diet of diabetics. Directions for growing and cooking each variety are given. The "mung bean" sprouts used in various Chinese dishes are particularly recommended.—*Harris M. Benedict.*

HORTICULTURAL PRODUCTS

425. ANONYMOUS. Cultivation of the African oil palm with special reference to the West Indies. [Rev. of: *Bull. Imperial Inst.* 18: 209. 1920.] *Jour. Soc. Chem. Indust.* 40: 42R-43R. 1921.—Hitherto nearly all of the palm oil and palm kernels of commerce have been prepared by primitive methods by the natives of West Africa. This article, intended to supply information of service to planters and companies contemplating the establishment of palm plantations, deals with the distribution and cultivation of the oil palm in various countries and under varying soil conditions. Data are given showing the comparative yield of variously aged trees.—*G. B. Ray.*

426. AJON, GUIDO. Sulla essenza di limone. Nota I. Distillazione frazionata e temperatura critica di soluzione. [Note on the essential oil of the lemon. Fractional distillation and critical temperature of solution.] *Ann. R. Staz. Sper. Agrumic. e Fruttic. Aereale* 4: 209-218. *Fig.* 1-2. 1916-18 [1919].—Fractional distillations of a pure and of an adulterated oil gave results as follows: Pure oil 270 cc., citral 0.9 cc., lemon terpenes 30 cc., sesquiterpenes 0.6 cc. Very little difference was noted in the temperatures of distillation of the pure and of the adulterated oil, though the author believes that there were slight significant differences in the critical temperatures of solution. A bibliography is appended.—*A. Bonazzi.*

427. CLEVINGER, JOSEPH F. A report on the *Zamia* starch situation. *Jour. Amer. Pharm. Assoc.* 10: S37-S40. *Pl. 1.* 1921.—The paper includes a description of *Zamia floridana* analysis of the rhizome portions, and a discussion of the *Zamia* starch situation, with notes

as to the cultivation of the plant, the supply of rhizomes, and preparation and uses of the starch. The only mill manufacturing *Zamia* starch, reported to have an annual capacity of about 750,000 pounds, has been idle since September, 1920, and it is uncertain when it will again be in operation. *Zamia* starch has been marketed under the name of "Florida Arrow-root" which the author states has led to confusion which will be increased if *Maranta* starch is to be manufactured in Florida, as now seems possible.—*Anton Hogstad, Jr.*

428. CRUESS, W. V., and A. W. CHRISTIE. Some factors of dehydrater efficiency. California Agric. Exp. Sta. Bull. 337. 277-298. 1921.—The cost of a dehydrater erected by the average fruit grower for operation during seasons of only 1 or 2 months must be as low as is compatible with reasonable efficiency if it is to be profitable. A completely equipped and satisfactory dehydrater can be built for \$500 or less per green ton capacity per 24 hours. The air-blast tunnel type of dehydrater is the most economical to operate in regard to both fixed charges and operating costs.—For efficiency the velocity of air across trays should not fall below 500 feet per minute, and the total volume of air per 100 square feet of tray surface should not be less than 250 cubic feet per minute. In order to reduce static pressure and secure maximum fan capacity, all air passages should be as large in area, as short in length, and as direct as possible. All the heated air should flow between the trays of drying fruit and be equally distributed among the several trays. This can be accomplished readily by proper relative dimensions of the drying chamber and trays, supplemented by the intelligent use of baffles and dampers. Multivane or steel plate fans, although more expensive, more than repay the extra cost by greater efficiency, especially in large dehydraters where high static pressures must be overcome.—Sulphured fruits should be dried on wooden trays, preferably with slat bottoms. Unsulphured fruits are most rapidly dried on screen trays. Air of 20-50 per cent relative humidity is advantageous for fruits which case-harden readily as such air permits steady evaporation at relatively high temperatures. Prunes and grapes are most rapidly dried if previously dipped in a boiling lye solution.—*A. R. C. Haas.*

429. GERUM, JOS. Zur Kenntnis der Steinpilzkonserven. [Studies of preserved *Boletus edulis*.] Zeitschr. Untersuch. Nahrungs- u. Genussmittel 41: 123-126. 1921.—Methods of canning and preserving these fungi are described, and analyses of preserved material and their canning-liquors are reported.—*E. E. Stanford.*

430. ROBAK, F. Grape seed oil. Jour. Indust. and Eng. Chem. 13: 919-921. 1921.—Domestic grape-seed oil as obtained from the Concord grape possesses some properties comparable with oils of foreign origin. The approximate composition of the oil is given.—*Henry Schmitz.*

MORPHOLOGY, ANATOMY AND HISTOLOGY OF VASCULAR PLANTS

E. W. SINNOTT, *Editor*

(See also in this issue Entries 133, 145, 248, 337, 423, 556, 569, 630, 704, 748, 786, 795, 797)

431. ANRAMS, A. The effect of chemical reagents on the microstructure of wood. Jour. Indust. and Eng. Chem. 13: 786-790. 1921.—A new procedure has been developed whereby the action of chemical reagents on the microstructure of wood may be readily followed either by the microscope or by photomicrographs. This method has been used in investigating the effects of various electrolytes on pine wood. A number of typical treatments are described and discussed. The results have been studied with the microscope, by photomicrographs, and by measurements with a film micrometer.—*Henry Schmitz.*

432. ARBER, AGNES. Leaf-base phyllodes among the Liliaceae. Bot. Gaz. 69: 337-340. 4 fig. 1920.—It is shown on evidence of ontogeny and comparative morphology that certain leaves among the Liliaceae, such as those of *Hemerocallis* and *Scilla*, are to be interpreted as equivalent to leaf-bases. The lamina is entirely absent, and the petiole is either also absent or

is present in an extremely reduced form. The solid, approximately cylindrical apices in which the leaves of *Hyacinthus*, *Tulipa*, etc., terminate are held to represent the last rudimentary phase of the vanishing petiole.—*Agnes Arber*.

433. BECHTEL, ALBERT REIFF. **The floral anatomy of the Urticales.** Amer. Jour. Bot. 8: 386-410. 3 pl. 1921.—The floral anatomy of a large number of genera and species in the Urticales was studied to discover fresh evidence as to the phylogenetic position of this order and the relationship between its various families. The following conclusions are drawn: *Ulmus* is the primitive genus, and here a whorl of stamens and one of perianth parts have been suppressed; the bicarpellate condition has been derived from a polycarpellate one; the perianth parts are reduced in number by abortion, suppression, and fusion; zygomorphy is a conspicuous character in the order; palmate venation sometimes persists in the perianth parts when lost in the foliage; the ovules are foliar organs; the vascular supply to the uniovulate ovary suggests a polyovulate ancestry; the flowers have been greatly reduced; the Urticales combine primitive and specialized characters and are thus to be regarded as a generalized group; they are probably not far removed from primitive entomophilous ancestors; they are probably a natural order consisting of 3 natural families as classified by Engler; the group is the culmination of a distinct line of descent from the same group of primitive angiosperms which also gave rise to the Ranalian line.—*E. W. Sinnott*.

434. BOBILIOFF, W. **The internal structure of the cortex of *Hevea brasiliensis*.** Tropic. Agric. 54: 134-139. 1920. A translation by G. BRYCE of: *De inwendige bouw der schorsselementen ven Hevea brasiliensis* [see Bot. Absts. 5, Entry 546].—The histological structure of the "secondary cortex" [secondary phloem] of *Hevea brasiliensis* is described in some detail, attention being given chiefly to latex vessels and sieve tubes. The latex is cell sap. The nuclei of the latex vessels are much larger than those of the cells from which the ducts arise. These nuclei are said to migrate longitudinally and also transversely through openings in the side walls, and may collect in groups. The contents of one latex tube may in the same way pass into another vessel. The author states: "There are nuclei and protoplasm in the sieve tubes but no latex." "In *Hevea* it sometimes happens that the perforations of the sieve plates become closed with callus," and "The latex vessels are interrupted in their longitudinal course by the medullary rays, hence above and below a medullary ray oblique walls sometimes appear in the latex vessels."—*A. J. Eames*.

435. BRYCE, G. **Translator's note.** [Rev. of some points in: BOBILIOFF, W. *The internal structure of the cortex of Hevea brasiliensis*. Tropic. Agric. 54: 134-139. 1920.] Tropic. Agric. 54: 139. 1920.—The writer discusses briefly the presence of nuclei in sieve tubes and states that "some corroboration appears necessary to substantiate the observation" of Bobiloeff that nuclei are present in the sieve-tubes of *Hevea brasiliensis*. He also discusses callus-formation in sieve tubes.—*A. J. Eames*.

436. GLEISBERG, W. **Der gegenwärtige stand der Membranforschung.** [The present status of membrane investigation.] Beih. Bot. Centralbl. 38: 217-265. 1921.—A discussion is presented of the chemistry and structure of the cell membrane in all groups of plants from bacteria, through the various groups of thallophytes, to the higher plants.—*L. Pace*.

437. GOEBEL, K. **Morphologische und biologische Bemerkungen. 31. Gelenkranken.** [Jointed tendrils.] Flora 114: 306-312. 2 fig. 1921.—In *Antigonum leptopus*, a climbing plant from Mexico, the tendrils are composed of a tendril-bearer and an upper branching part. They are derived from inflorescences in which flower formation has been suppressed. The uppermost bracts have become tendril-branches. The tendril-bearer forms the knee-shaped bends which have led to the name "jointed tendrils." A comparison is made with the tendrils of the Cucurbitaceae and the following conclusion formed: All tendrils which are modified stems have come from the transformation of flower pedicels, whose bracts have become the branches of the tendrils.—*A. M. Starr*.

438. GOEBEL, K. Zur Organographie der Lemnaceen. [The organography of the Lemnaceae.] *Flora* 114: 278-305, 12 fig. 1921.—The paper is divided into 3 parts. (1) The asymmetry of the vegetative joints and their plasticity. *Lemna trisulca* under favorable conditions is nearly symmetrical. In weak light all of the limited food material goes to the + branch, the - branch is correlatively suppressed and the dichotomous branching is changed to a helioid sympodium. (2) The organization of the exceedingly simple form, *Wolffella*, is discussed. The author differs from Hegelmaier in regard to the planes of symmetry, and considers *Wolffella* merely an extreme example of the characteristic family tendency toward asymmetry. (3) Homology of the vegetative organs is discussed, and the writer argues that the vegetative body must be a leaf with a meristematic region at the base, corresponding to a rudimentary stem axis, from which new members arise. He regards the embryo of *Lemna* as corresponding to the typical monocotyledonous embryo (cotyledon terminal) but lacking an organized stem growing-point. In its place is retained a meristematic area at the base of the cotyledon from which arises the first "leaf." The plant permanently retains this type of organization.—*Laetitia M. Snow*.

439. GRAF, JAKOB. Beiträge zur Kenntnis der Gattung Populus. [The genus Populus.] *Beih. Bot. Centralbl. Abt. 1.* 38: 405-454. Pl. 10-11, 10 fig. 1921.—Rows of cells for the conduction of tannin are present in the stem. The leaf structure of *P. canadensis*, *P. nigra*, and *P. tremula* is described. In July the staminate and pistillate flower buds are already recognizable on the younger branches, the staminate being much the larger. The megaspore mother cell is differentiated in January. The archesporial region is evident from July to September. Frequently more than one archesporial cell reaches the mother cell stage. The tapetum consists of 2-3 or more cells. Only 1 division takes place from the mother cell stage to the embryo sac stage, the lower of the 2 daughter cells developing into the sac. The first indication of the integument appears in February. One integument is present in *P. alba* and *P. tremula*, while *P. canadensis* and *P. canescens* have 2, the inner not so well developed.—There are 3 divisions in the embryo sac. The diploid number of chromosomes in *P. tremula* and *P. canadensis* is 8. The antipodals are ephemeral, degenerating before fertilization. The embryo sac breaks through the nucellus and presses into the micropyle. The epidermal cells of the placenta and funiculus grow out to form the 1-celled hairs found on the ripe seed. It is certain that fruit develops in *P. tremula* without fertilization, but its character needs more investigation. *Populus* and *Salix* are compared, as are the Salicaceae and Amelanchiaceae, with the conclusion that these families are closely related and stand at the beginning of the dicotyledons.—*L. Pace*.

440. HARRIS, J. ARTHUR, EDMUND W. SINNOTT, JOHN Y. PENNYPACKER, and G. B. DURHAM. Correlations between anatomical characters in the seedling of *Phaseolus vulgaris*. *Amer. Jour. Bot.* 8: 335-365, 8 diagr. 1921.—In continuation of their work on the structure of normal and abnormal seedlings the authors here report on the correlation between bundle number in various regions of the seedling. They find a substantial correlation between the number at the base and that in the mid-region of the hypocotyl; but little or no correlation between the number at any level of the hypocotyl, on the one hand, and the number in the mid-region of the epicotyl, on the other. This indicates that there is a complete reorganization of the vascular system at the cotyledonary node. The authors point out that not only do the various vascular structures differ in their degree of variability but that they also differ in the intensity with which they are interrelated with each other.—*E. W. Sinnott*.

441. HARRIS, J. ARTHUR, EDMUND W. SINNOTT, JOHN Y. PENNYPACKER, and G. B. DURHAM. The vascular anatomy of hemitrimorous seedlings of *Phaseolus vulgaris*. *Amer. Jour. Bot.* 8: 375-381, 1921.—The "hemitrimorous" bean seedling possesses 3 cotyledons and 2 primordial leaves. The number of vascular bundles at the base and in the mid-region of the hypocotyl of such a type is very close to that found in the trimorous seedling (which possesses 3 cotyledons and 3 primordial leaves). It is distinctly higher than the number present in the normal dimorous type. In the central region of the epicotyl, however, the bundle number

of the hemitrimorous form is essentially intermediate between that of the trimorous and that of the normal. There is thus a rather close interdependence between external differentiation and internal structure in these 2 internodes.—E. W. Sinnott.

442. JOHN, ALBIN. Beiträge zur Kenntnis der Ablösungseinrichtungen der Kompositenfrüchte. [Contributions to a knowledge of methods of fruit separation in the Compositae.] Beih. Bot. Centralbl. 38: 182-203. Fig. 1-35. 1921.—The fruit is usually narrowed at the base, where the parenchymatous tissue dries. In the *Taraxacum* type the pappus spreads out and makes the force of the wind effective. If a pappus is lacking, the involucre bracts flatten out and form a container for the ripe fruits; the mechanical separation is due largely to wind and rain. In the *Aster* type, there are hairs near the base which serve to pry or mechanically lift the fruit so that it is easily blown off by the wind. Some genera, e.g., *Buphthalmum*, have chaff with sclerenchyma cells, which, by absorbing moisture and drying out, bring about movements that tend to separate the achenes. In *Centaurea*, the cells which hold the fruit in position are largely destroyed as the fruit ripens, so that winds and other mechanical means easily separate the fruits.—L. Pace.

443. KANEHIRA, R. Anatomical characters and identification of Formosan woods with critical remarks from the climatic point of view. 315 p., 50 pl. Government of Formosa: Taihoku, 1921.—An anatomical study of Formosan woods is presented, the species investigated numbering 386, representing 226 genera and 66 families, these comprising about 80 per cent of the woody plants of the island and including nearly all the indigenous genera. The microscopic structure of each species is described in much detail and is illustrated by photomicrographs. There are also short descriptions of macroscopic, physical, and chemical characters such as color, hardness, durability, specific gravity, flavone content. Brief mention is made of economic uses. Artificial keys based on microscopic features are given. An attempt is made to correlate anatomical differences with climatic conditions by studying also 160 woody species of the Philippines and 181 of Japan. Many tables have been prepared showing for the woods of the 3 countries such features as the distribution of vessels, number of vessels per unit area; maximum diameter, character of pitting, and character of perforation of vessels; maximum diameter of fibers; arrangement of wood parenchyma and type of medullary rays. Among the conclusions drawn are the following: "Ring-porous woods are more numerous in the temperate zone than in the tropics. Number of pores per unit area gradually decreases toward the tropics but the diameter of pores follows an inverse course; in other words, tropical woods are coarser in texture than those of the temperate zone. Metatracheal parenchyma is more frequent in the tropics than in the temperate zone. Scalariform perforation of vessels occurs more frequently in the tropics than in the temperate zone. Wood fibers have usually thicker walls and larger diameter in tropical woods than in those of the temperate zone. Spiral thickenings in vessels occur more frequently in the temperate zone than in the tropical zone."—The "vegetational character" of the woody flora of Formosa is discussed in considerable detail and is compared with that of Japan and the Philippines.—A. J. Eames.

444. KANEHIRA, R. Identification of the important Japanese woods by anatomical characters. 104 p., 9 pl. Government of Formosa: Taihoku, 1921.—The physical properties and anatomical characters of 181 species of Japanese woods are presented. Each wood is described in much histological detail and is illustrated by photomicrographs. An anatomical synopsis is given in the form of an analytical key.—A. J. Eames.

445. MOLISCH, HANS. Aschenbild und Pflanzenverwandtschaft. [Ash structure and plant relationships.] Sitzungsber. Akad. Wiss. Wien [Math.-Nat. Kl.] Abt. I. 129: 261-294. 3 pl. 1920 [1921].—The crystal picture afforded by the residue after ashing plant parts is in many instances characteristic for the family and sometimes the genus and species to which the plant belongs. The ash structure thus becomes an aid to systematics, sometimes reinforcing and sometimes acting as a check on gross morphological classification. The microscopic study of ash residues is of service also in determining the purity of drugs and food materials

derived from plants.—These statements are supported by a number of illustrations drawn from the author's investigations showing the distribution of the various crystal components and forms in a number of genera and plant families. For example, the Acanthaceae and Urticaceae are characterized by the presence of cystoliths of certain forms; the Gramineae show silicified cells of one form, the Cyperaceae of another; the Iridaceae have spit-like crystals of calcium oxalate. The method of reducing plant parts to ash before examination gives a far better idea of the density, distribution, and variety of crystal forms than does the study of fresh sections.—*F. Weiss.*

446. PETERSEN, HENNING E. Some preliminary remarks on the origin of isolated bundles in herbaceous dicotyledonous plants. Bot. Tidsskr. 37: 136-147. Fig. 1-6. 1920.—According to Jeffrey and his students, an unbroken woody cylinder is the primitive stage in the development of the stem structure of herbaceous dicotyledonous plants. The vascular bundles in the herbaceous stem are separate parts of this cylinder. The author quotes Eames as follows: "A primitively solid cylinder has been reduced and dissected to form the type characteristic of dicotyledonous herbs—a ring of small separate bundles." Sinnott and Bailey agree in assuming a continuous cylinder as the starting point in herbaceous evolution. From his studies of stem development, however, the author states that the primary stage is an annular formation of cells in which initial cell-groups of the leaf traces and other vascular bundles can easily be discerned. Slightly later the cambium is formed, the fascicular as well as the interfascicular. The first stage is thus an annular formation of cells distinctly separated from the pith and the cortex which by divisions within distinct areas develops into vascular bundles. He contends that when separate bundles can be discerned in dicotyledonous woody plants or old forms, it is clear that the evidence for the hypothesis of a preliminary continuous cylinder is not of great value. It is much more probable that when in recent forms the woody cylinder is split up into separate bundles this development is only a return to an older stage on isolation of the fundamental conducting tissue, the bundles.—*A. L. Bakke.*

447. PFEIFFER, H. Die Kegezzellen innerhalb der Gefäßbündelscheide bei *Cladium Mariscus* R. Br. [Cone cells inside the vascular bundle sheath of *Cladium Mariscus*.] Beih. Bot. Centralbl. Abt. 1. 38: 401-404. Pl. 9. 1921.—Cone cells are also found in other genera of the Cyperaceae. Those cones are siliceous. They are found in the epidermis of the pistil leaves, and leaf-sheath, sometimes more than 1 in a cell. Those around the bundle are in the parenchyma cells next to the outer mechanical cells of the bundle, with the base of the cone against the mechanical cell. Various suggestions have been made concerning their possible significance.—*L. Pace.*

448. PORSILD, THOREBJØRN. Griffelhaarene hos *Dryas octopetala* L. og *D. integrifolia* Vahl. [The pubescence of the styles in *Dryas octopetala* and *D. integrifolia*.] Bot. Tidsskr. 37: 121-124. 1920.—The pubescence of the mature styles of *Dryas octopetala* is shorter and more compact than in *D. integrifolia*. In northeastern Greenland, however, the species are alike. Differences in pubescence were noted between individuals of *D. octopetala* inhabiting Iceland and the Faeroes and those found in the Alps, the Pyrenees, and northern Eurasia and America.—*A. L. Bakke.*

449. REA, MARGARET W. Stomata and hydathodes in *Campanula rotundifolia* L., and their relation to environment. New Phytol. 20: 56-72. Fig. 1-6. 1921.—The number of stomata per square mm. varies, increasing especially on the upper surface with a higher position of the leaf on the shoot, and on the under surface with increase of illumination and dryness of habitat. The increase in the sun shoot as compared with the normal shoot is thought to be associated with increased photosynthesis. The size of the stomata and their arrangement on the leaf vary.—Hydathode groups are present on the upper surfaces of all leaves, but are more numerous on leaves near the base of the shoot.—*I. F. Lewis.*

450. REICHE, KARL. Zur Kenntnis von *Sechium edule* Sw. [An account of *Sechium edule*.] *Flora* 114: 232-248. 9 fig. 1921.—This account of the chayote vine of Mexico takes up the development and structure of the ovule, fruit, and embryo; the perennial habit of the underground parts; the vascular anatomy of stem and root; and the use of the fruit and tubers as food. The ovary contains 1 ovule which develops an embryo sac with a peculiar long hypha-like sucking organ. The integument of the ovule shows but slight differentiation and at an early stage grows fast to the wall of the embryo. The unusually advanced condition of the embryo at maturity of the fruit may be related to these peculiarities. The anatomy of the stem is that typical of the Cucurbitaceae.—A. G. Stokey.

451. RIEDE, WILHELM. Untersuchungen über Wasserpflanzen. [Studies of water plants.] *Flora* 114: 1-118. 3 fig. 1920.—A morphological and physiological study of the Aponogetonaceae is presented. A well-developed latex system distinguishes this family from other aquatics. Hydropotes, groups of modified epidermal cells, are found on submerged parts. Normal development results from a preponderance of organic substances; a preponderance of inorganic substances induces a return to the juvenile habit. The type of leaf is determined largely by the depth of water, light being the important factor. The Aponogetonaceae resemble most closely the Alismaceae, but are probably of independent origin.—From a study of the staminate plants of *Elodea densa* and the pistillate ones of *E. crispata*, the author concludes that the former is correctly placed in the genus *Elodea*, but that *E. crispata* should be placed in a new genus to which he gives the name *Helodidymia*.—On the basis of experimental work and a comparative study of the root and shoot development under various conditions, the author emphasizes the movement of water in aquatics and the work of the root in absorption. He opposes Mayr's interpretation of hydropotes as "water drinkers" and regards them as organs of excretion which help to maintain the "guttation stream."—A. G. Stokey.

452. SCHROTER, C. Une singulière déformation de la cime d'un épicéa. [An unusual deformation of a spruce tree crown.] *Jour. Forest. Suisse* 71: 168-171. 1920.—A peculiar witches broom is regarded as demonstrating that the strobilus is a modified branch. On the same axis are alternating branches and cones and numerous instances of transition from one to the other. This appears to prove that the strobilus is derived not from a simple flower but from an inflorescence.—W. C. Lowdermilk.

453. STELL, W. N. Vegetative reproduction and aposporous growths from the young sporophyte of *Polypodium irioides*. *Bull. Torrey Bot. Club* 48: 203-205. Fig. 1-3. 1921.—In an old culture of *Polypodium irioides* sporophytes were observed on the leaves of which regeneration occurred. In some cases only leaves were formed, in others complete sporophytes and some gametophytic outgrowths.—P. A. Munz.

454. WALTER, HEINRICH. Über Perldrüsenbildung bei Ampelideen. [Pearl-glands in the Ampelidaceae.] *Flora* 114: 187-231. 6 fig. 1921.—The author regards the pearl-glands of the Ampelidaceae as pathological structures. His observations and experiments support Stahl's theory that they are due primarily to the checking of excretion with an ensuing accumulation of salts in the cells of the tissue just below a stomate. They can be produced at will by control of cultural conditions: They are most abundant where there is very rapid growth; when there is abundant soil moisture they increase in warm and dry weather; they are checked by wetting of the leaves.—A. G. Stokey.

455. WATSON, W. *Ruscus aculeatus* L. *Jour. Botany* 59: 264. 1921.—Observations are presented on the dioecious and slight subdioecious character of "Butcher's Broom."—S. H. Burnham.

456. WILDEMAN, E. DE. *Clerodendron à tiges fistuleuses*. [Clerodendron with hollow stems.] *Compt. Rend. Soc. Belge Biol.* 83: 582-584. 1920.—Several African species of

Clerodendron, among them *C. excavatum*, *C. angolense*, and *C. cauum* De Wild. nov. sp., have hollow stems, but it has not been proved that all produce myrmecodomatia. Biologists working in Africa may perhaps obtain useful evidence bearing on the discussion of the theory of symbiosis, which in the author's opinion is not such an important question as some have held it to be.—*Henri Michiels*.

457. WILDEMAN, E. DE. La regression des fleurs mâles chez des bananiers africains. [Degeneration of the male flowers in some African bananas.] Compt. Rend. Soc. Belge Biol. 83: 1002-1004. 1920.—Flowers are usually arranged spirally in bananas. In the bananas of Mayumba, the inflorescences may be grouped into 3 principal types: (1) Female flowers at the base and above them the male flowers, which persist on the rachis for a considerable time after anthesis (*Musa purpureo-tomentosa*, *M. bidigitalis*, *M. paradisiaca* var. *Kitebbe*, var. *Bilu*, var. *viridis*); (2) female flowers at the base and above them the male flowers, which drop off quickly after anthesis (*M. Brieyi*, *M. sapientum* var. *Salama*, var. *Salama-rubra*); (3) groups of female flowers entirely without male flowers (*M. emasculata*, *M. protrachorachis*). Transitions between these types occur. This degeneration is perhaps associated with pollination. The flowers may originally have been hermaphrodite and later become unisexual, with the male flowers sterile. Fertilization does not occur. There is still, perhaps, an excitation of the tissues of the ovary by pollen which has become unable to germinate and effect fertilization normally.—*Henri Michiels*.

458. WISSELINGH, C. VAN. Bijdragen tot de Kennis van de Zaadhuid. Elfe bijdrage: Over de Zaadhuid der Solanaceen. [Contributions to a knowledge of the seed-coat. Eleventh contribution: The seed-coat of the Solanaceae.] Pharm. Weekbl. 58: 788-794, 815-824. Pl. 1, fig. 9. 1921.—The seeds of *Atropa belladonna*, *Mandragora officinarum*, and *Hoscyamus niger* were examined during their development, as well as the ripe seeds of *Lycopersicon esculentum* Mill., *Solanum dulcamara* L., *S. tuberosum* L., *Physalis Alkekengi* L., *Capsicum annuum* L., *Nicandra physaloides* Gaertn., *Datura Stramonium* L., *Cestrum Parqui* Philérit, *Nicotiana tabacum* L., *N. affinis*, *Petunia hybrida grandiflora*, *Schizanthus hybridus grandiflorus*, *Salpiglossis variabilis grandiflora*, and *Browallia demissa* L. All these seeds have an anatropous ovule with 1 integument. In the ovule 1 cuticle on the epidermis, 1 between the integument and the nucellus, and 1 around the micropylar canal can be seen. The cuticle on the epidermis becomes very thin and cannot always be identified by means of potassium chlorate and nitric acid. The cuticles between the integument and the nucellus and that around the micropylar canal also disappear very rapidly. The nucellar tissue is rapidly absorbed. The cellular layer between the integument and the endosperm is not the outer layer or the nucellus but only the innermost part of the integument. On the endosperm a new cuticle is formed which completely encases it. The thick epidermal wall, consisting of cellulose, contains at times cork cells.—*H. Engelhardt*.

MORPHOLOGY AND TAXONOMY OF ALGAE

E. N. TRANSEAU, *Editor*

L. H. TIFFANY, *Assistant Editor*

(See also in this issue Entries 246, 248, 436, 812)

MORPHOLOGY AND TAXONOMY OF BRYOPHYTES

ALEXANDER W. EVANS, *Editor*

(See also in this issue Entries 120, 121, 136, 149, 153, 248, 436, 747)

459. AMANN, J. Nouvelles additions et rectifications à la Flore des Mousses de la Suisse. [List of additions and corrections to the Flore des Mousses de la Suisse.] Bull. Soc. Vaud. Sci. Nat. 53: 81-125. 18 fig. 1920.—This is the 2nd list of additions to the Flore des Mousses de la Suisse [see Bot. Absts. 4, Entry 1032]; the 1st list has already been abstracted [see Bot.

Absts. 5, Entry 614]. Besides new reports on distribution, minor corrections, and descriptions of 29 varieties and forms proposed as new, the article contains: (1) Descriptions of *Barbula poenina*, *Bryum appendiculatum*, *B. Britanniae*, *Mnium amblystegium*, and *Syntrichia gelida*, all proposed as new species; (2) a study of the cell dimensions in the leaves of the European species of *Mnium*, especially the *Orthorhynchia*, with tabulations of the number of cells per square mm.; (3) a description of the sporophyte of *Ptychodium pallescens* Amann; and (4) a synoptic key to the European species of *Hygroamblystegium*.—E. B. Chamberlain.

460. AMANN, J. *Nouvelles additions et rectifications à la Flore des Mousses de la Suisse. Troisième série.* [Third list of additions and corrections to the Flore des Mousses de la Suisse.] Bull. Soc. Vaud. Sci. Nat. 54: 33-66. 1 fig. 1921.—As in the 2nd list of additions [see preceding entry] the present article includes notes on distribution and corrections, together with descriptions of 10 varieties or forms proposed as new. It contains also the following: (1) A note upon the discovery of a pure tuft of undwarfed male plants of *Dicranum Muehlenbeckii* B. & S.; (2) a comparative study of *Fissidens minutulus* Sull. and *F. pusillus* Wils., the conclusion being reached that these species represent parallel forms but differ rather constantly in the relative laxity of cell tissue in the leaves; (3) a note upon *Stylostegium*; (4) synoptic keys for the determination of the European species of *Pseudoleskea* and *Pseudoleskeella*; (5) a note upon the "cellular index," i.e., the average number of cells per square mm., the idea being advanced that this number gives a more accurate method of determining cell dimensions than general descriptive terms or actual measurements of cell lumina; and (6) a proposed classification of the luster of moss leaves, as none, silky (with 5 degrees), and glossy [grass ou véronissé].—E. B. Chamberlain.

461. CHAMBERLAIN, EDWARD B. *Notes on current literature of mosses.* Bryologist 24: 27-30. 1921.—The reviewer abstracts recent articles by Thériot [see Bot. Absts. 4, Entry 1041; 6, Entries 160, 161; 7, Entry 1093] and Williams [see Bot. Absts. 7, Entry 1094] and reviews briefly Amann's second list of additions to the Flore des mousses de la Suisse [see Bot. Absts. 11, Entry 459]. In discussing Amann's paper his tendency to name minute variations is deplored, a list of his proposed new species is cited, his attempt to find a more accurate method of determining sterile Mnium is commended, and his statement is questioned that *Hygroamblystegium noterophilum* (Sull.) Warnst. is the same as *H. fallax* var. *spinifolium* (Schimp.) Warnst.—E. B. Chamberlain.

462. DIXON, H. N. *On a collection of mosses from the Kanara District.* Jour. Indian Bot. 2: 174-188. 1 pl. 1921.—This is a report on collections made by L. J. Sedgewick in or near the North Kanara District, Madras Presidency, India. Notes are given for the 43 species and varieties listed. The following species are proposed as new: *Archidium birmanicum*, *Barbula dharwarensis*, *Ctenidium stereodontoideum*, *Fissidens imbricatus*, *F. karyarensis*, *F. macrosporus*, *F. subfirmus*, *Leucoloma strictifolium*, *Pinnatella limbata*, and *Vesicularia Levieri*. Two new varieties under *Calypogeia Nietneri* C. M. and *Brachypodium turgidum* Broth. & Dixon are likewise proposed.—Winfield Dudgeon.

463. EVANS, A. W. *The genus Riccardia in Chile.* Trans. Connecticut Acad. Arts and Sci. 25: 93-209. Fig. 1-13. 1921.—Twenty-five species of *Riccardia* are listed as native to Chile, 3 of which are described as new, viz., *R. diversiflora*, *R. mycophora*, and *R. Thaxteri*. A detailed description is given of each species, most of which are also represented by figures. A key to the species based on vegetative characters, a historical summary, a detailed discussion of the characters of the genus and of its affinities and phylogeny are also included. The following new nomenclatorial combinations are made for species previously listed under *Aneura*: *Riccardia autoica* (Steph.), *R. calva* (Schiffn. & Gottsche), *R. chilensis* (Steph.), *R. conimita* (Steph.), *R. corallensis* (Steph.), *R. crassierispa* (Steph.), *R. crispa* (Schiffn. & Gottsche), *R. floribunda* (Steph.), *R. fuscobrunnea* (Steph.), *R. grandata* (Steph.), *R. Negeri* (Steph.), *R. nudimitra* (Steph.), *R. pallidivirens* (Steph.), *R. Saratieri* (Steph.), *R. spectabilis* (Steph.), *R. tenax* (Steph.), *R. tenerima* (Steph.). The following species are reduced to synonymy:

Aneura endiviaefolia Goebel (under *R. crispa*), *A. Lindaviana* Steph. (under *R. prehensilis* [Hook. f. & Tayl.] Massal.), *A. spinuloba* Steph. (under *R. Spegazziniana* Massal.), *A. subnigra* Steph. (under *R. alpicornis* [Hook. f. & Tayl.] Trevis.), and, doubtfully, *A. profunda* Steph. (under *R. floribunda*).—G. E. Nichols.

464. GAISBERG, E. VON. Beiträge zur Kenntnis der Lebermoosgattung *Riccia*. [Contributions to our knowledge of the liverwort genus *Riccia*.] Flora 114: 262-277. 1921.—The author summarizes the results of an investigation on *Riccia*, carried on at Munich. In the 1st part of the paper numerous species are compared with respect to anatomical structure, some of these species belonging to the *Euriccia* group and the others to the *Ricciella* group. The conclusion is reached that the distinctions between the groups are inconstant and that *Ricciella* therefore should not be separated as a genus from the more typical species of *Riccia*. A similar conclusion is reached in the case of *Riccina*, recently proposed as a genus by Trabut [see Bot. Absts. 5, Entry 621]. In the 2nd part a series of culture experiments under varied conditions is described. Species of *Euriccia*, although more or less xerophytic in habit, were successfully grown under water and exhibited very slight anatomical modifications. Species of *Ricciella*, under similar circumstances, showed greater modifications, and the opinion of Familler is supported that *Riccia fluitans* is not a definite species but includes the aquatic states of several distinct forms. At the conclusion of the paper the conditions affecting germination are discussed and the results of experiments are tabulated in considerable detail. It is shown that fully mature spores require a period of rest before germination but that slightly immature ones will germinate almost immediately.—A. W. Evans.

465. GOLA, G. Contributo alla conoscenza delle Epatiche del Katanga (Congo Belge). [Contribution to our knowledge of the Hepaticae of Katanga (Belgian Congo).] Nuovo Gior. Bot. Ital. 27: 244-250. 24 fig. 1920.—The author gives an account of a small collection of Hepaticae made by Bovone in the district of Katanga, Belgian Congo, Africa. Some of the specimens were too incomplete for determination, but 10 species are definitely enumerated. Except for the widely distributed *Targionia hypophylla* L. these species are all proposed as new and are described and figured under the following names: *Dicranolejeunea Bovonei*, *Lejeunea microloba*, *L. pallidissima*, *L. polyandra*, *Madothea katangae*, *Plagiochila Bovonei*, *P. katangae*, *P. perforens*, and *Radula multiramea*.—A. W. Evans.

466. GYÖRFFY, I. Nachträge zum "Illustr. Handwörterbuch der Botanik," II. Aufl. [Additions to the second edition of the "Illustr. Handwörterbuch der Botanik."] Oesterreich. Bot. Zeitschr. 67: 228-234. 1918.—The author enumerates about 80 terms, mostly bryological in character, which are not included in Schneider's well-known glossary of botany. In connection with many of these terms he gives definite references to the literature.—A. W. Evans.

467. HAUPT, ARTHUR W. Life history of *Fossombronina cristula*. Bot. Gaz. 69: 318-331. Pl. 16-19, 1 fig. 1920.—The vegetative body consists of a minute, creeping, profusely branched shoot with genuine leaves; the apical cell is dolabrate, and branching is apical. The plants are monoecious, the sex organs occurring in the leaf axils. There is no time relation in the order of appearance of the antheridia and archegonia, which may occur in the same leaf axil. Until the appearance of the 1st vertical wall, young archegonia and antheridia are indistinguishable. The archegonia are of an advanced type. The early embryo divisions are transverse, and the lower half of the fertilized egg contributes to the development of the sporophyte, not merely forming an appendage to the foot. The sporophyte is primitive, and the sporogenous tissue is differentiated early. The elaters are rudimentary, each being homologous with a single spore mother cell.—H. C. Cowles.

468. LETACQ, A.-J. Hépatiques. [Hepaticae.] Bull. Soc. Linn. Normandie VI, 9: 42-44. 1916 [1919].—Notes are given on the following 3 Hepaticae, found in the vicinity of Alençon, France: *Lejeunea calcarea* Lib., *Plagiochila spinulosa* Dum., and *Ptilidium ciliare* Nees. The specimens of the *Lejeunea* are said to approach *L. Rossettiana* Massal., and the opinion is expressed that the latter is only a form of *L. calcarea*.—A. W. Evans.

MORPHOLOGY AND TAXONOMY OF FUNGI, LICHENS, BACTERIA, AND MYXOMYCETES

II. M. FITZPATRICK, *Editor*

(See also in this issue Entries 116, 248, 436, 532, 548, 568, 573, 584, 585, 587, 588, 591, 596, 600, 601, 654, 688, 690, 730, 770, 784)

FUNGI

469. ANONYMOUS. Index to American mycological literature. *Mycologia* 13: 272-277. 1921.

470. ANONYMOUS. [Rev. of: OUDEMANS, C. A. J. A. *Enumeratio Systematica Fungorum*. Vol. I and II. *cxvi* + 1230 p. *xix* + 1069 p. Martinus Nijhoff: The Hague, 1919-20 (see Bot. Absts. 8, Entries 2067, 2068).] *Jour. Botany* 59: 117. 1921.

471. ANDERSON, P. J., and MARGUERITE G. ICKIS. Massachusetts species of *Helvella*. *Mycologia* 13: 201-228. *Pl.* 11-12. 1921.—A key and descriptions of 11 species of *Helvella* are furnished.—H. R. Rosen.

472. ARTHUR, J. C. Memoranda and index of cultures of Uredineae, 1899-1917. *Mycologia* 13: 230-262. 1921.—A compact summary of culture work conducted by the writer over a period of 19 years, corrections of the reports dealing with these studies, together with indexes of the various fungi and hosts involved are presented.—H. R. Rosen.

473. BIJL, PAUL A. VAN DER. Note on the i-kowé or Natal Kafir mushroom, *Schulzeria Umkowaan*. *South African Jour. Sci.* 17: 286-287. 1921.—This large mushroom is called by the natives i-kowé, and is known to Europeans as the beefsteak or butter mushroom. The species is described, and its remarkably deep-rooted stalk is mentioned.—E. M. Doidge.

474. BISBY, G. R. Short cycle *Uromyces* of North America. *Bot. Gaz.* 69: 193-217. 1 pl. 1920.—The paper deals with characters and relationships, life-histories, cytology, hosts, and taxonomy. Eleven species of *Uromyces* possessing only telia and pycnia, or telia alone, are present in North America. These are found especially in the higher and warmer portions of the continent, and occur upon 7 widely separated host families. While they form a group agreeing as to life cycle and the 1-celled character of the teliospores, it is not felt that phylogenetic interrelationship is thereby shown, morphological evidence indicating rather that the relatives of species of these rusts are found among other rusts upon the same or related hosts. Indeed, a group of hosts may bear a number of rusts of various life cycles, belonging to *Puccinia* and *Uromyces*, widely distributed geographically, yet all showing a certain agreement in morphological characters, especially in the telial stage.—G. R. Bisby.

475. BOTTOMLEY, AVERIL M., and CLAUDE FULLER. The fungus food of certain termites. *South African Jour. Nat. Hist.* 3: 139-144, 223. *Pl.* 3-4. 1921.—It can be readily demonstrated that immature forms of *Macrotermes natalensis* feed regularly on the cells composing the white spheres which grow on the ant comb, and as there are relatively few spheres the conclusion cannot be avoided that every removal is made good almost at once by rapid growth. During the rainy season *Podaron pistillaris* or *P. carcinomalis* grow out of the mounds of termites belonging to the genus *Trinervitermes*, but no species of this genus is a fungus grower and there is no relation between the *Podaxon* and the fungus grown by termites. The true fungus growers, those making special combs upon which white spheres grow, all belong to the *Termes* group as represented by the African genera *Acanthotermes* Syost., *Allodontermes* Silo., *Macrotermes* (sensu Fuller), *Termes* L., *Microtermes* Wasmann, and *Ancistrotermes* Silo. It was observed that a flagged stoep was being carpeted with triturated comb from the nest below the stones by *Termes badius* Hav. In a few hours there developed on this dozens of fructifications of a small agaric. The same process was observed on other occasions and the fungus identified

as *Entoloma microcarpum*. The evidence is not complete but it is suggested that there is a relation between the white spheres and the small agaric, and that this special provision is made for the fruiting of the fungus.—*E. M. Doidge*.

476. CHURCH, MARGARET B., and CHARLES THOM. Mold hyphae in sugar and soil compared with root hairs. *Science* 54: 470-471. 1921.—It requires an oil immersion lens with long working distance to observe mold hyphae growing among such objects as crystals of sugar or soil particles. They grow in the same intimate relationship with the particles as do the root hairs of higher plants, forcing their way between them in a winding path. It is impossible to separate the hyphae from the particles without injury.—*C. J. Lyon*.

477. COKER, W. C. Genera of the lower Basidiomycetes not before reported from North America. *Jour. Elisha Mitchell Sci. Soc.* 36: 14. 1920.—The genera *Saccoblastia*, *Platyglea*, and *Strobasidium* are reported for the first time from America.—*W. C. Coker*.

478. COKER, W. C. Notes on the Thelephoraceae of North Carolina. *Jour. Elisha Mitchell Sci. Soc.* 36: 146-196. Pl. 1-35. 1921.—Thirteen genera are treated, some fully, others with representative species. *Aleurodiscus macrodens* is described as new. Six of the plates are of microscopic detail, the others are photographs.—*W. C. Coker*.

479. GROVE, W. B. The British species of *Milesina*. *Jour. Botany* 59: 109-110. 1921.—The occurrence of 2 fern rusts, *Milesina Kriegeriana* and *M. Polystichi* (Wineland) comb. nov., never before recorded from Great Britain, is noted. A list of the fern rusts found in the British Isles is given.—*Adele Lewis Grant*.

480. JACKSON, H. S., and E. B. MAINS. Aecial stage of the orange leaf-rust of wheat, *Puccinia triticina* Eriks. *Jour. Agric. Res.* 22: 151-171. Pl. 21. 1921.—The aecidial stage has been produced in the greenhouse on several species of *Thalictrum*, and seems to be restricted to this genus.—*H. M. Fitzpatrick*.

481. KRIEGER, L. C. C. Is *Amanita pantherina* edible or poisonous? *Mycologia* 13: 270-271. 1921.

482. LAIBACH, F. Untersuchungen über einige Septoria-Arten und ihre Fähigkeit zur Bildung höherer Fruchtformen. III und IV. [Septoria species in relation to higher fruiting forms.] *Zeitschr. Pflanzenkrankh.* 31: 161-194. 14 fig. 1921.—The author continues his search for perfect stages of species of *Septoria*. The present installment deals, in section III, with *Septoria aceris* (Lib.) Berk. et Br., and other maple Septoriae. He gives proof of the relationship of 3 different fruit forms, viz., *Mycosphaerella latebrosa* as the ascigerous form of *Septoria aceris*, with an auxiliary micro-conidial form, *Phyllosticta platanoides*. Section IV discusses *Septoria apii* (Briosi et Cav.) Chester, and *S. petroselinii* Desm. Experiments to discover the ascigerous stage of these 2 species yielded negative results. It is emphasized that *S. apii* is sharply confined to celery. Similarly, *S. petroselinii* is specialized on parsley, though it may slightly infect other Umbelliferae. Of special interest to the pathologist are the suggestions of control measures for the celery blight. The fungus does not occur on other native and cultivated plants. The most important factor in perpetuating this disease is the use of diseased seed. Seed treatment for 24 hours with a 2 per cent solution of copper sulphate is recommended. In the author's opinion the securing of seed from entirely sound stock is most important.—*H. T. Güssow*.

483. MATTIROLA, ORESTE. Neo-Saccardia Mattirola (nuova Sclerodermatacea ipogea). [Neo-Saccardia Mattirola, a new hypogeous genus of the Sclerodermataceae.] *Atti R. Accad. Sci. Torino* 56: 27-32. Fig. 1-4. 1921.—The new genus Neo-Saccardia is based on the species *N. echinata* n. comb. (syn. *Tuber echinatum*). The genus falls between *Melanogaster* and *Scleroderma*, but differs essentially from them in the structure of its peridium and type of

spores. *Neo-Saccardia* has a peridium characteristically echinate with a thick pseudoparenchyma extending into a layer of colored filaments giving the appearance of a double peridium; while in *Melanogaster* the peridium is homogeneous both in structure and color, and not pseudoparenchymatous. In *Scleroderma* the peridium is homogeneous, thick, colorless, and not pseudoparenchymatous. *Neo-Saccardia* differs from *Melanogaster* and *Scleroderma* in having labyrinthiform gleba chambers and in the possession of aculeate spores. It shows points of similarity with *Pompholix*. It is found in the Malay Peninsula.—*Harriet M. Libby*.

484. SATIN, SOPHIE. Studies in the development of certain species of the Sordariaceae. Bull. Nat. Moscou 1916: 116-142. Pl. 1-2. 1916 [1918].—The article is written in English. The perithecia in *Podospora fimbriata*, *P. curvula*, *P. anserina*, *P. setosa*, *P. coprophila*, and *Sordaria fimbicula* develop from multicellular spirally coiled ascogonia; antheridia are wholly absent. Several cells of the ascogonium develop ascogenous hyphae. The vegetative hyphae and cells of the ascogonium are multinucleate. The disposition of nuclei in pairs observed in the ascogonium is evidently the result of mitosis. It cannot be regarded as an apogamous pairing since by the time of the formation of the ascogenous hyphae the nuclei lie separately. There is no fusion of nuclei in the ascogonium, but in it nuclei of 2 sizes occur. The larger are perhaps growth nuclei ready for division. The ascogenous hyphae contain numerous pairs of nuclei and crozier formation of the usual type occurs.—In *Sporormia intermedia* the cells of the mycelium give off a chain of short cells which divide and form knots. Certain cells of the knot later become differentiated to form "Woronin hyphae," from which ascogenous hyphae arise. All the cells of the young perithecium are uninucleate.—*H. M. Fitzpatrick*.

485. SHUFFELDT, R. W. Common American mushrooms. Amer. Forest. 27: 579-587. Fig. 1-13. 1921.

486. STEVENS, F. L. Dothidiaceae and other Porto Rican fungi. Bot. Gaz. 69: 248-257. 2 pt., 3 fig. 1920.—*Halstedtia*, a new genus, is here described, 1 species being noted, *H. portoricensis*. The following new species are also described: *Uleodothis Pteridis*, *Dothidella portoricensis*, *D. flava*, *Catacauma Ocoteae*, *C. palmicola*, *Catacaumella Gouaniae*, *Phaethothopsis Eupatorii*, *Dimerina monenses*, *Gloniella rubra*, *Guignardia Justiciae*, *G. Tetracygiae*, *G. Nectandrae*, *Zignoella algaphila*, and *Phyllosticta bonduc*. The new genus *Halstedtia* appears to have transitional features between the Dothideales and Perisporiaceae.—*H. C. Coxles*.

487. THOM, CHARLES, and EDWIN LE FEVRE. Flora of corn meal. Jour. Agric. Res. 22: 179-188. 1921.—The organisms commonly found in samples of corn (*Zea mays*) meal are: *Aspergillus repens*, *A. flavus*, *A. tamari*, *A. niger*, *Citromyces* sp., *Fusarium* sp., *Penicillium oxalicum*, varieties of *P. luteum*, *Mucor* sp., *Rhizopus nigricans*, *Sancephalastrum* sp., yeasts—principally of the mycoderma type—and bacteria. Colon-aerogenes and lacto-bacilli are prevalent especially in freshly ground meal, while aerobic, spore-forming rods and micrococci are present throughout storage.—When the moisture content of meal rises above 13 to 15 per cent, *Aspergillus flavus* becomes an active agent in spoilage. Meal held together in small clumps or balls is usually infested with this organism. When the moisture content of meal rises to 16 per cent, several other species become active, and at 18 to 20 per cent numerous fungi and bacteria develop.—Species of *Fusarium*, *Diplodia*, *Aspergillus*, and *Penicillium* are commonly found in the germinal area and the tip of the kernel. These organisms are eliminated in varying degrees by different milling systems.—*D. Reddick*.

LICHENS

488. BACHMANN, E. Der Thallus der Kalkflechten mit *Chroolepus*-, *Scytonema*-, und *Xanthocapsa*-Gonidien. [The thallus of calcareous lichens with gonidia belonging to the genera *Chroolepus*, *Scytonema*, and *Xanthocapsa*.] Abhandl. [Nova Acta] K. Leopold.-Carolinisch. Deutsch. Akad. Naturf. 105: 1-80. Pl. 1-4. 1920.—The author describes the structure of the thallus in 14 species of calcareous lichens. In his studies he has relied largely on stained microtome sections, and these have enabled him to clear up many structural fea-

tures which had heretofore been obscure. Among the species considered the following have gonidia belonging to the genus *Chroolepus*: *Sagedia persicina* Kbr., *S. byssophylla* Kbr., *Acrocordia conoidea* (Fr.) Kbr., *Arthropyrenia saxicola* Mass., *Opegrapha calcarea* Turn., *O. saritilis* DC. (including the variety *Pruinosa* Kbr.), *O. saxicola* Mass., *Gyalecta leucopis* Mass., *G. cupularis* (Ehrh.) Schaer., *Jonaspis melanocarpa* (Kryhb.) Mass., and *J. Prevostii* (Fr.) Krphb. In *Petractis clausa* (Hoffm.) Arn. the gonidia belong to *Scytonema*, while in *Xanthopyrenia tichothecioides* (Arn.) Bachmann, comb. nov., and *Psorotichia Montinii* (Mass.) Forss. they belong to *Xanthocapsa*. *Xanthopyrenia* represents a new genus based on *Arthropyrenia tichothecioides* Arn. The distinctive features of the species discussed are contrasted by means of a key, while the histological details are clearly shown on the 4 colored plates. Except in the 2 species of *Sagedia* the gonidial layer is bounded above by a more or less distinct cortex composed of dead or dying hyphae. With the exception of the minute *Psorotichia Montinii*, which grows upon *Verrucaria parmigera* Stur. as a substratum, the gonidial layer is bounded below by a medullary layer. The latter may be exceedingly thin and is not always clearly defined, owing to downward extensions of the gonidial layer.—A. W. Evans.

489. BIORET, G. Sur les Graphidées corticales. [On the corticated Graphideae.] Compt. Rend. Acad. Sci. Paris 172: 1438-1441. 1921.—A description of the structure of the cortex of these lichens is given. Some variations which depend on the species of the host are reported. There is an especially marked difference between the structure of the cortex of *Graphis* growing on the cherry and that on the maple.—C. H. Farr.

BACTERIA

490. BERSA, EGON. Über das Vorkommen von kohlenisaurem Kalk in einer Gruppe von Schwefelbakterien. [Occurrence of calcium carbonate in a group of sulphur bacteria.] Sitzungsber. Akad. Wiss. Wien [Math.—Nat. Kl.] Abt. 1. 129: 231-259. 2 fig. 1920 [1921].—The author reports a morphological and physiological study of *Achromatium oxaliferum* Schewiakoff, with notes on *Microspira vacillans* Gieckhorn and *Pseudomonas hyalina* Gieckl. *Achromatium* is a macro-bacterial form occurring in muck in both fresh and brackish water; it is equivalent to *Modderula* Frenzel and *Hillhousia* West and Griffith. In size it ranges from $9-75 \times 9-25\mu$. In the living state the protoplasm possesses an open-reticulate structure with large vacuoles, but shows no differentiation into peripheral layer and central body. An organized nucleus is not present, although granules of a nucleoprotein nature are imbedded in the reticulum. The membrane contains no cellulose and seems to be a condensed peripheral layer of the plasma; it is surrounded by a slime sheath. No motile appendages are present and the organism is but slowly and irregularly motile. Division takes place by equational abstriction. Sulphur globules embedded in the reticulum are constantly present in *Achromatium* and *Microspira* but absent from *Pseudomonas hyalina*; the amount of sulphur present is dependent upon the H_2S content of the medium. These forms are therefore physiologically true sulphur bacteria. Within the vacuoles calcium carbonate granules were present in all 3 species, and $CaCO_3$ could also be demonstrated in crystalline form under certain conditions. The function and conditions of formation of $CaCO_3$ are unknown but its constant and abundant occurrence distinguish these species as forming a somewhat distinct group.—F. Weiss.

491. BUNYEA, HUBERT. A souring of beef caused by *Bacillus megatherium*. Jour. Agric. Res. 21: 689-698. 2 fig. 1921.—*Bacillus megatherium* sours beef under a wide range of temperature conditions, but not in the absence of oxygen. The organism is described as to morphology and cultural characters. It is non-pathogenic for rabbits and guinea pigs and does not produce an appreciable amount of toxin on raw beef.—D. Reddick.

492. FLORENCE, LAURA. Spiral bodies in bacterial cultures. Jour. Bact. 6: 371-377. 1921.—A review of the literature bearing on the subject is given with observations on different species of bacteria including *B. cereus*, *B. mesentericus-fuscus*, and *B. mesentericus-vulgatus*. Spiral bodies resembling spirochetes were found in the condensation water of young cultures, rarely, if ever, on agar slants or in bouillon; their lack of motility and reaction toward stains

differentiate them from true spirochetes. Their presence in cultures of motile bacteria only suggests that they are connected with flagella, possibly as several flagella broken off and twisted together.—*Chester A. Darling.*

493. HUCKER, G. J. Microscopic study of bacteria in cheese. Jour. Agric. Res. 22: 93-100. Pl. 17. 1921.—Samples of cheese were embedded and sectioned in order to study the progress of ripening. It is possible by this method of direct examination not only to determine the number of organisms present in the sample but also to gain an idea of the types of organisms present and to study the organisms as they actually exist in the mass. Cultural methods alone do not show as high a count as the microscopic method, due primarily to the selective action of the medium used and to the difficulty of liberating the organisms from the cheese mass previous to plating. A combination of microscopic and cultural studies gives a more complete idea of what takes place in cheese ripening than can be obtained by either method alone.—*D. Reddick.*

494. MOELLER, HERMANN. Bemerkungen zu der Veröffentlichung von Ernst H. Pringsheim: Ein neues Verfahren zur Darstellung von Sporen im Bakterienkörper. [Remarks on the publication of Ernst H. Pringsheim entitled: A new method for demonstrating the spores in the bacterial cell.] Ber. Deutsch. Bot. Ges. 37: 279-280. 1919.—The author states, with reference to Pringsheim's paper [see following entry], that the essential part of the method, maceration of the bacterial membrane with chromic acid, was first suggested by him; and that the lack of permanence ascribed by Pringsheim to the methylene blue-malachite green preparations is due to failure to treat the smears, after flaming, with absolute alcohol.—*R. M. Holman.*

495. PRINGSHEIM, ERNST G. Ein neues Verfahren zur Darstellung von Sporen im Bakterienkörper. [A new method for demonstrating spores in bacterial cell.] Ber. Deutsch. Bot. Ges. 37: 182-183. 1919.—The principal features of this method are treatment of the smears with chromic acid, staining with carbol fuchsin, differentiating with methyl alcohol, and the use of Chinese ink or Cyanochin. The preparations, in which the spores are deep red and the bacteria colorless against a gray or blue background, are more permanent than when methylene blue and malachite green are used. [See also preceding Entry.]—*R. M. Holman.*

496. TILLEY, F. W. Influence of peptone on indol formation by *Bacillus coli*. Amer. Jour. Public Health 11: 834-836. 1921.—The varying composition of the different kinds of peptone available in this country may cause a typical strain of *B. coli* to give negative, weak or strong reactions for indol, depending on the kind of peptone used, and the time of incubation. It is advisable to test each new lot of peptone used in order to determine its suitability for indol production and also the optimum incubation time. A test for the presence of tryptophan will usually indicate the relation value of any given sample of peptone for use in making indol tests.—*C. A. Ludwig.*

MYXOMYCETES

497. ANONYMOUS. [Rev. of: LISTER, GULIELMA. (1) The Mycetozoa: A short history of their study in Britain; an account of their habits generally; and a list of species recorded from Essex. vi + 54 p. frontispiece. Essex Field Club Special Memoirs. Vol. 6. Simpkins, Marshall & Co., Ltd.: 1918. (2) Guide to the British Mycetozoa exhibited in the department of botany. 4th ed., 62 p. 51 fig. British Museum [Natural History]: London, 1919.] Jour. Quekett Microsc. Club 14: 172. 1920.

498. HILTON, A. E. A log and some Mycetozoa. Jour. Quekett Microsc. Club 14: 131-136. 1920.—An account is given of the development of Mycetozoa both naturally and by the scattering of spores on a single log.—*L. B. Walker.*

499. LISTER, G. *Arcyria virescens* sp. nov. Jour. Botany 59: 252-253. 1921.—This species is found on dead wood in Ceylon, Malay Peninsula, and Queensland.—S. H. Burnham.

500. LISTER, G. Mycetozoa found during the Minehead foray. Trans. British Mycol. Soc. 7: 10-12. 1921.—The Myxomycetes found (49 species) in the vicinity of Minehead, Somersetshire, during the autumn foray of 1920 are reported with brief notes on the habitats of several species.—W. B. McDougall.

501. LISTER, G. New or rare species of Mycetozoa. Jour. Botany 59: 89-93. 1 pl., fig. 1-3. 1921.—The author proposes a new genus, *Minakatella*, belonging to the family Arcyriaceae. He describes a single species, *M. longifila*, found growing on a persimmon tree in Japan. *Arcyria cinerea* var. *carnea* Lister is raised to specific rank as *A. carnea*; *Physarum ovisporum* and *Didymium difforme* var. *repandum*, both native of England, are described as new, while *D. Trochus* Lister is recognized as a synonym of *D. vaccinum* (Durien & Montagne) Buche.—Adele Lewis Grant.

PALEOBOTANY AND EVOLUTIONARY HISTORY

EDWARD W. BERRY, *Editor*

(See also in this issue Entry 433.)

502. B., G. S. The early history of plants. Jour. Botany 59: 297-298. 1921.—The author summarizes the address delivered by D. H. Scott, before the Botanical Section of the British Association, entitled: The present position of the theory of descent, in relation to the early history of plants [see also Bot. Absts. 11, Entry 521].—S. H. Burnham.

503. BENSON, MARGARET. Note on a numerical sequence of plant families. New Phytol. 20: 90-91. 1921.—The difficulties of a linear arrangement of plant groups, even with omission of fossil forms, are pointed out.—I. F. Lewis.

504. BENSON, MARGARET. The grouping of vascular plants. New Phytol. 20: 82-89. 1921.—Phylogeny is discussed from the standpoint of the 3 leaf types and the character of the sporangiphore (soroma) of fossil and living vascular plants, with some consideration also of strobilar characters. The "haplophylls" are primitive uninerved leaves as shown in the Lycopodiales and Psilotales, but in no seed plants; the "meiophylls" are simply elaborated primitive leaves showing a definite trend toward a repeated dichotomy of the veins (Sphenopsida, Cordaitales, Ginkgoales, Taxales, Coniferales); and the "meriphylls" are the complex meriphytic leaves of Filicales, Cycadales, Pteridosperms, Gnetales, and Angiosperms. These 3 groups are distinguished not only by the character of the leaf but also by the method of insertion of the soroma and the date of origin of the strobilus. A diagram gives in graphic form the relationships of the groups of Vasculates.—I. F. Lewis.

505. BROOKS, C. E. P. Variations of climate since the ice age. Nature 108: 90-92. 2 fig. 1921. [Abridged from a paper in Quart. Jour. Roy. Meteor. Soc. July, 1921, pp. 173-194.]

506. CARPENTIER, A. Revue des travaux de paléontologie végétale, publiés dans le cours des années, 1910-1919. [Review of the work in paleobotany published 1910-1919.] Rev. Gén. Bot. 33: 437-448, 471-477. 1921.

507. CARPENTIER, A. Sur la présence de Cycadophytes dans le gisement wealdien de Féron (Nord). [On the presence of Cycadophytes in the Wealden of northern France.] Compt. Rend. Acad. Sci. Paris 173: 327-329. 1921.—The following types are described from the Lower Cretaceous of northern France: *Nilsonia*, probably *N. orientalis*; *Taeniopteris*, probably *T. vittata*; and a *Ptilophyllum*. These illustrate the well known continuity between the flora of the Jurassic and that of the Lower Cretaceous.—C. H. Farr.

508. ECKHOLD, WALTER. Die Hoftüpfel bei rezenten und fossilen Koniferen. [The bordered pits of recent and fossil conifers.] Abstract Dissert. Breslau. 4 p. 1921.—Six generic types are characterized, of which the following are new: *Protopinozylon*, *Protouniperozylon*, *Protocupressinozylon*, and *Protopodocarpozylon*.—E. W. Berry.

509. FRITEL, P. H. Sur la découverte au Sénégal, de deux fruits fossiles appartenant aux genres *Kigelia* D. C. et *Nipadites* Bowerb. [Discovery in Senegal of two fossil fruits belonging to the genera *Kigelia* and *Nipadites*.] Compt. Rend. Acad. Sci. Paris 173: 245-246. 1921.—Two fossil fruits are described from the Eocene of Senegal: *Kigelia Praepinnata* nov. sp., belonging to the Bignoniaceae, and *Nipadites Burtini* Brongnt., belonging to the Arecales. —C. H. Farr.

510. GOLDRING, W. Annual rings of growth in Carboniferous wood. Bot. Gaz. 72: 326-330. Pl. 14. 1921.—Specimens of *Cordaites recentium* (Dawson) Penhallow, from the Upper Carboniferous Admire formation of Oklahoma, showing well marked annual rings are described and misstatements are corrected with respect to the geographical distribution of Paleozoic woods showing growth rings, made in Jeffrey's Anatomy of Woody Plants.—E. W. Berry.

511. GOTHAN, W. Paläobotanik. [Paleobotany.] 142 p., 23 fig. 1920.—The present is a very elementary paleobotanical text forming one of the science primers of the Göschen series. —E. W. Berry.

512. HEMMER, A. Die fossile Flora der oberen Ottweiler Schichten des Saarbeckens. [The fossil flora of the upper Ottweiler beds of the Saar Basin.] Geogn. Jahresh. 1918-1919: 263-298. Pl. 6-10. 1920.—Species, for the most part well known, are recorded for the following genera from the upper Ottweiler or Breitenbacher beds of Permian age of the Saar Basin: *Pecopteris*, 20; *Sphenopteris*, 11; *Diplotmema*, 2; *Odontopteris*, 2; *Althopteris*, 7; *Callipteridium*, 2; *Sphenophyllum*, 5; *Calamites*, 2; *Annularia*, 2; *Asterophyllites*, 2; *Palaeostachya*, 2; *Lepidostrobus*, 3; *Sigillaria*, 3; and *Sigillariostrobus*, *Stigmaria*, *Pterophyllum*, *Rhabdocarpus*, *Trigonocarpus*, *Samaropsis*, *Neuropteris*, *Linopteris*, *Aphlebia*, *Macrostachya*, *Equisetites*, *Lepidophyllum*, *Lepidophloios*, each 1. Of the above species, 2 of *Althopteris*, and 1 each of *Pecopteris*, *Sphenopteris*, *Linopteris*, *Calamites*, and *Annularia* are considered new.—E. W. Berry.

513. KRASSER, FRIDOLIN. Die Doggerflora von Sardinien. [The dogger (lower oolite) flora of Sardinia.] Sitzungsber. Akad. Wiss. Wien. [Math.-Nat. Kl.] Abt. 1. 129: 3-28. 1920 [1921].—The report is based on collections made in Laconi, Cignoni, and Tupe Caniga by Domenico Lovisato, 37 distinguishable species, all of Jurassic age, being enumerated. Some fossils were obtained in a very favorable state of preservation. The following are reported as new to science: *Laconiella sardinica* and *Sardoa Robitscheki*. Twenty-three of the species reported are known also in the dogger flora of the coast of Yorkshire as reported by Seward and 5 are represented in the Jurassic flora of Grahamland as compiled by Halle. Seven species are known only from Sardinia, namely, *Otozamites Lovisatoi* and *Zamites* sp. (leaves), *Laconiella sardinica* (pollen sacs or seed bearing axes), *Cycadosperrum* (2 species), *Aracacites sardinicus* (seeds within scales), and *Sardoa Robitscheki* (Cycadophyte-like stem portions). The limited occurrence of *Otozamites*, which is well represented in the Jurassic of England, France, and North Italy, is noteworthy.—F. Weiss.

514. KRÄUSEL, R. Ist *Taxodium distichum* oder *Sequoia sempervirens* Charakterbaum der deutschen Braunkohle? [Is *Taxodium distichum* or *Sequoia sempervirens* the characteristic tree of the German brown coal?] Ber. Deutsch. Bot. Ges. 39: 258-263. 1921.—It is concluded that the *Sequoia* was far more common than the *Cypress* in the formation of the brown coal.—E. W. Berry.

515. KRÄUSEL, R. Paläobotanische Notizen IV. Die Erforschung der tertiären Pflanzenwelt, ihre Methoden, Ergebnisse und Probleme. [Paleobotanical notices IV. The study

of the Tertiary plant world, methods, results, and problems.] *Senckenbergiana* 3: 87-98, 1921.

516. KRÄUSEL, R. Über einige Pflanzen aus dem Keuper von Lunz (Nieder Österr.). [Upon plants from the Keuper of Lunz in Lower Austria.] *Jahrb. Preussisch. Geol. Landes.* 41: 192-209. Pl. 9-11. 1921.—The author restudies certain fossil plants from the classic upper Triassic locality of Lunz in Austria and concludes from both macro- and microscopic characters that *Clathrophyllum lunzense* Stur should be transferred to the genus *Baiera* of the Ginkgoales; that *Pterophyllum longifolium* Brongniart is a member of the order Cycadeoidales of the Cycadophytes, and that *Taeniopteris* or *Macrotaeniopteris simplex* Krasser may be either a marattiaceous fern or a cycadophyte.—E. W. Berry.

517. PRINCIPI, PAOLO. Synopsis della flora oligocenica di Chiavon e Salcedo. [Synopsis of the Oligocene flora of Chiavon and Salcedo.] *Atti Soc. Lig. Sci. Nat. e Geol.* 31²: 1-34. 1921.—A restudy of the large collections of fossil plants from this classic region of middle Oligocene (Rupelian) age in Venetia results in a list of 325 species, of which 26 are cryptogams, 10 gymnosperms, 47 monocotyledons, and 269 dicotyledons.—E. W. Berry.

518. REGÈ, ROSINA. Note su alcuni vegetali del Carbonifera della Cina. [Note on Carboniferous plant fossils of China.] *Atti Soc. Ital. Sci. Nat. Mus. Civ. Milano* 59: 183-196. Pl. 9. 1921.—Species from the Carboniferous of Shansi, China, are described in the following genera: *Sphenopteris*, 14, of which 3 are new; *Pecopteris*, 4, of which 1 is new; *Taeniopteris*, 3; *Lepidodendron*, 2; *Sigillaria*, 5; *Diplomema*, *Asterothera*, *Lepidophyllum*, *Cordaites*, *Stigmara*, *Palaeostachya*, *Cordaispermum*, and *Annularia*, each 1; *Chansithea*, new genus with 1 new species.—E. W. Berry.

519. REID, C., and J. GROVE. The Charophyta of the lower Headon beds of Hordle Cliffs. *Quart. Jour. Geol. Soc. London* 77: 175-192. Pl. 4-6. 1921.—The authors emphasize the merits of the Charophyta for purposes of precise correlation, and describe 12 species from the Eocene of England. There are 9 new species of *Chara* and 3 of *Tolypella*, based on fossil oogonia; various fragments of the vegetative parts are also described and figured.—E. W. Berry.

520. ROUND, EDA M. *Odontopteris genuina* in Rhode Island. *Bot. Gaz.* 72: 397-403. 5 fig. 1921.—The author describes and figures the abundant remains of a large fern-like plant, formerly confused with *Odontopteris brardii* Brongniart, which the author identifies as *Odontopteris genuina* Grand'Eury, and states that it is exceedingly common in the Coal Measures of the Narragansett Basin.—E. W. Berry.

521. SCOTT, D. H. The present position of the theory of descent, in its relation to the early history of plants. *Nature* 108: 153-159. 1921.—(From presidential address, Section K (Botany), at British Association at Edinburgh on Sept. 9.) "While the theory of descent or evolution is undisputed, we really know nothing certain as to the way in which new forms have arisen from the old." Variations are now known to be fluctuations and incapable of giving rise to new forms. Mutations are accepted by some but by others suspected of being Mendelian segregates. Lotsy proposes to find the true origin of species in Mendelian segregation. Crossing has given some surprising results, is open to unlimited experiments, and these may be a great help in tracing past evolution. Suggestion of Church that chief morphological characters of the land flora were outlined in the sea is very suggestive and is supported by the fossil Rhyniaceae. The latter have been referred to thallophytes by some, to bryophytes or to pteridophytes by others. At least these groups are brought closer together by this discovery. It is also possible to regard the simple leaves of *Asteroxylon* as a reduction stage. The idea that Gymnosperms were derived, through the Pteridosperms, from the ferns, probably must be given up. Scott cannot at present decide between such polyphyletic views as those of Arber and Church and the monophyletic of Halle, Kidston and Lange.—O. A. Stevens.

522. SEWARD, A. C., and R. E. HOLTUM. On a collection of fossil plants from southern Rhodesia. South. Rhodesia Geol. Surv. Bull. 8: 39-45. Pl. 9-11. 1921.—The following poorly preserved Permian or Triassic plants from the Somabula diamond-bearing gravels of southern Rhodesia are recorded: *Schizoneura gondwanensis*, *Thinnfeldia odontopteroides*, *T. sp.*, *Ctenopteris sp.*, cf. *Pleuromeia*, and *Dadoxylon sp.*—E. W. Berry.

523. WIELAND, G. R. Two new North American Cycadeoids. Bull. Geol. Surv. Canada 33: 79-85. Pl. 9-12, fig. 8. 1921.—*Cycadeoidea Sternbergii* from the Belly River beds of the Red Deer River, Alberta, and *C. Boesiana* from the Cretaceous of Wise County, Texas, are described.—E. W. Berry.

PATHOLOGY

G. H. COONS, *Editor*

C. W. BENNETT, *Assistant Editor*

(See also in this issue Entries 3, 7, 29, 41, 42, 60, 73, 81, 93, 94, 98, 225, 285, 298, 327, 335, 383, 469, 482, 741, 758, 784, 807, 809, 815, 861.)

PLANT DISEASE SURVEY: REPORTS OF DISEASE OCCURRENCE AND SEVERITY

524. CORTINI, JONE COMANDUCCI. Il Fusicladium cerasi sulle pesche. [F. cerasi (Rahh.) Sacc. on peaches.] Boll. Mens. R. Staz. Patol. Veg. 1: 107. 1920.—Scab was observed on peaches in the markets of Rome about the middle of September, 1920. Hitherto the disease on peach has been found principally in North America, only very rarely in Italy.—D. Reddick.

525. COTTON, A. D. Report on the occurrence of insect and fungus pests on plants in England and Wales for the year 1919. Ministry Agric. and Fisheries Intelligence Dept. Plant Pests Branch Misc. Publ. 33. 68 p. 1921.—The section on fungus pests contains a list of the fungus diseases of England and Wales.—O. A. Stevens.

526. DAWSON, W. J. Some problems in economic biology in East Africa (Kenya Colony). Ann. Appl. Biol. 8: 83-100. 1921.—Bud rot of palm is said to be destructive to introduced varieties; native varieties are resistant. Ring spot (*Colletotrichum agaves*) of hemp is prevalent in the rainy seasons. Coffee rust (*Hemileia vastatrix*) is very destructive at low altitudes where temperature and humidity are relatively high. The first attack is most severe, a certain amount of resistance being acquired by the host after being associated with the rust fungus. Leaf spot (*Cercospora coffeicola*), berry spot (*Septoria sp.*) and die-back, cause undetermined, are other common diseases of coffee. Heart rot (*Fomes juniperinus*) is common on *Juniperus procera*, and a Sclerotinia disease is destructive to *Brachylaena* seedlings. On wheat, black stem rust (*Puccinia graminis*), yellow rust (*P. glumarum*), and leaf rust (*P. tritirina*) are prevalent under humid conditions. Early maturing varieties escape the rainy seasons and are relatively free from rust. Flax wilt (*Fusarium lini*), believed to have been introduced with seed, is rapidly spreading.—C. W. Bennett.

527. FERDINANDSEN, C., OG SOFIE ROSTRUP. Oversigt over Sygdomme hos Landbrugets og Havebrugets Kulturplanter i 1919. [A survey of disease of field and garden crops during 1919.] Tidsskr. Planteavl 27: 400-450. 1920.—This consists of notes on the occurrence of plant diseases caused by insects and fungi in Denmark during 1919.—Albert A. Hansen.

528. FOËX, E. Les maladies des plantes pendant le 1er semestre de 1921. [Plant diseases in France from January to July 1921.] Bull. Soc. Path. Vég. France 8: 88-97. 1921. The drought was exceptional and but slightly favorable to the development of parasites, except the mildews (*Erysiphe graminis* on wheat, *Polosphaera leuckotricha* on apple), which, however, did not spread except in the humid regions where cloudy conditions prevailed. The leaf-rust of wheat (*Puccinia glumarum*) was found.—Jean Dufrenoy.

529. MANUEL, H. L. Downy mildew. Agric. Gaz. New South Wales 32: 745-747. 1 fig. 1921.—In 1917 this disease practically ruined the vineyard crop in Victoria, over 6,000 acres. Loss in average season may be small, but spraying should not be neglected.—L. R. Waldron.

530. MEDALLO, MARIANO G. Fiji disease of sugar cane in the Philippine Islands. Phytopathology 11: 251-252. 1921.—The Fiji disease of sugar cane has been found in 3 provinces of the Islands. The Philippine Plant Quarantine Board has issued a regulation prohibiting movement of cane material from these provinces.—B. B. Higgins.

531. PAMMEL, L. H. The relation of native grasses to *Puccinia graminis* in the region of Iowa, western Illinois, Wisconsin, southern Minnesota and eastern North Dakota. Proc. Iowa, Acad. Sci. 26: 163-192. 1919.—This article names the wild grasses infected by *P. graminis* in the regions named, with localities. Maps show in detail the relation of rust to nearby barberries.—H. S. Conard.

532. RIZA, ALI. Deux nouvelles observations: *Puccinia Prunispinosae* sur pommier et *Uromyces Terebenthi* sur *Pistacia vera*. [Two new observations: *Puccinia Prunispinosae* on apple and *Uromyces Terebenthi* on *Pistacia vera*.] Bull. Trimest. Soc. Mycol. France 36: 125-127. Fig. 1-2. 1920.

533. SAVASTANO, L. Le direttive della fitopatologia. [The future aims of phytopathology.] Ann. R. Staz. Sper. Agrumic. e Fruttic. Acireale 4: 6-16. 1916 1918 [1919].—The history of the advent of new diseases into new territories and a consideration of the main tendencies in the past indicate the present tendency of free interchange of parasites over the world. The period of speicographic study of the parasites is slowly blending into the period of biological study of the parasite; but before results of real value can be expected the biology of both the host and parasite must be considered. This interrelationship is much less understood in economic entomology than in economic mycology. The author discusses future work under the following heads: (1) Special biology of the cultivated species in relation to general laws; (2) the environmental conditions, pathological geography; (3) cultivation systems; (4) the cultivated plant groups; and (5) prophylaxis.—A. Bonazzi.

534. SEYMOUR, EDITH K., and FRANK T. MCFARLAND. Loss from rye ergot. Phytopathology 11: 284-289. Fig. 1-2. 1921.—Field studies of rye (*Secale cereale*) parasitized by ergot (*Claviceps purpurea*) showed that a great many of the florets are either empty or contain blasted kernels. The percentage of such empty florets and blasted kernels increased as the number of sclerotia per spike increased. Microscopic examination of the empty florets showed the fungus to be present in a large per cent of cases. The results indicate that the yield of rye is greatly reduced when ergot is present.—B. B. Higgins.

535. SMITH, ERWIN F., and R. E. B. MCKENNEY. A dangerous tobacco disease in the United States. U. S. Dept. Agric. Dept. Circ. 174. 4 p. 1921.—This disease, new to the U. S. A., which appears to be due to *Peronospora hyoscyami*, was first reported in Gadsden County, Florida, and is now general over the cigar wrapper producing area in the Georgia-Florida district. It does not appear to have damaged tobacco in Europe, but in Australia it has been known as a destructive disease in tobacco seed beds. It has also been reported from South Africa. In 1885 Farlow reported it from southern California on shrubby wild tobacco (*Nicotiana glauca*); doubtless it occurs also in Texas. No definite explanation of the origin of the parasite is at hand, although it may have come to Florida on mats used on baled tobacco from Sumatra, or from California.—L. R. Hesler.

536. SMITH, ERWIN F., and R. E. B. MCKENNEY. The present status of the tobacco blue-mold (*Peronospora*) disease in the Georgia-Florida district. U. S. Dept. Agric. Dept. Circ. 181. 2 p. 1921.—The weather during the summer of 1921 was unfavorable to the parasite, and damage was substantially confined to the lower leaves. Hot, dry weather the 1st 10

days of May appears to have had much to do with checking development after a threatening start. The fungus does not spread on harvested and cured tobacco.—*L. R. Hester*.

THE PATHOGEN (BIOLOGY; INFECTION PHENOMENA; DISPERSAL)

537. ASHBY, S. F. Relation between cacao pod rot and coconut bud rot. *Agric. News* [Barbados] 20: 318. 1921.—This is a brief account of cross-inoculation experiments with species of *Phytophthora* from cacao and the coconut and pure culture studies of the organisms. Indications are that the species on cacao does not attack the coconut and that cacao pods are not rotted by the coconut bud-rot form. Although cultures of the 2 were very much alike, no sexual spores (oospores) being formed, the question whether the organisms are distinct species or 2 biological varieties of 1 species can not be answered at present.—*J. S. Dash*.

538. BREWLEY, W. F., and W. BUDDEN. On the fungus flora of glasshouse water supplies in relation to plant diseases. *Ann. Appl. Biol.* 8: 10-19. 1921.—Nursery waters in Lea Valley, England, were examined and found to contain small numbers of fungus spores. Among the genera mentioned are *Botrytis*, *Cladosporium*, *Phytophthora*, *Phoma*, and *Fusarium*. The authors consider water supplies an important source of disease. Methods of purifying contaminated waters by filtration, boiling, and addition of chemicals are given.—*J. J. Christensen*.

539. BOYLE, C. Studies on the physiology of parasitism. VI. Infection by *Sclerotinia libertiana*. *Ann. Botany* 35: 337-348. 1921.—The article treats of the method by which hyphae of *Sclerotinia libertiana* penetrate the epidermis of the bean leaf. Threads coming in contact with the cell wall become flattened and increase in thickness. The central part of the tip in contact with the host cells pushes forward, forming a small "infection hypha," which first dents the wall and then breaks its way through to the interior of the cell.—*C. W. Bennett*.

540. CRAIGHEAD, F. C. Hopkin's host-selection principle as related to certain cerambycid beetles. *Jour. Agric. Res.* 22: 189-220. 1921.—Experiments are reported in support of the promise that "a species [of insect] which breeds in 2 or more hosts will prefer to continue to breed in the host to which it has become adapted."—*D. Reddick*.

541. DOOLITTLE, S. P. Overwintering of bacterial wilt of cucurbits. *Phytopathology* 11: 299-300. 1921.—Evidence accumulated during 2 years supports the findings of Rand and Enlows that the striped cucumber beetle (*Diabrotica vittata*) carries the wilt-producing bacteria (*Bacterium tracheiphilus*) through the winter months.—*B. B. Higgins*.

542. EATON, S. V. Parasitism. [Rev. of: HAWKINS, L. A., and R. B. HARVEY. Physiological study of the parasitism of *Pythium debaryanum* Hesse on the potato tuber. *Jour. Agric. Res.* 18: 275-297. 3 pl., 2 fig. 1919 (see Bot. Absts. 4, Entry 1298).] *Bot. Gaz.* 69: 357. 1920.

543. GARNER, MAX W., and W. W. GILBERT. Field tests with cucumber angular leaf-spot and anthracnose. *Phytopathology* 11: 298-299. 1921.—Evidence has been obtained that the angular leaf-spot organism (*Bacterium lachrymans*) does not overwinter in the soil. The bacteria persisted on the cucumber (*Cucumis sativus*) seed for 20 months, but were dead at the end of 32 months. The anthracnose fungus (*Colletotrichum lagenarium*) survives 1, but apparently not 2, winters in the soil.—*B. B. Higgins*.

544. GOSS, R. W. Temperature and humidity studies of some *Fusaria* (sic!) rots of the Irish potato. *Jour. Agric. Res.* 22: 65-79. Pl. 10-11. 1921.—*Fusarium oxysporum*, *F. trichothecoides*, and *F. radiclecola* were used in inoculation experiments at controlled temperatures and humidities. At 25°C. all 3 produced more or less rotting, the rapidity varying with the humidity. At 16° no rotting was caused at very low humidities and only slow rotting at higher humidities. At 9° rotting took place only at the 2 highest humidities, being slight in both cases. At 5° no rotting took place except a very slight one with *F. trichothecoides* at 100

per cent humidity. Humidity apparently has a marked influence on the rate of rotting after infection has taken place as well as on infection itself. Old tubers proved more susceptible to rotting than new ones.—*K. H. Fernow.*

545. HEALD, F. D. The relation of spore load to the per cent of stinking smut appearing in the crop. *Phytopathology* 11: 269-278. 1921.—The relation of the spore load, or the number of spores of *Tilletia tritici* per grain of wheat (*Triticum sativum*), to the amount of smut in the crop grown from such seed was studied in naturally infected and also in artificially infected seed. The results were similar in both cases, except that in the case of naturally infected seed sown in the spring the amount of smut in the resultant crop was less than the estimated spore load indicated, due, probably, to the fact that many of the spores spread over the surface of the grain dried during the winter. In inoculating seed artificially at least 0.5 gm. of powdered smut well distributed over 100 gm. of seed, approximately 35,000 smut spores per grain, was necessary to produce maximum infection. With a small spore load, below 500 smut spores per grain, some varieties of spring wheat produced a smut-free crop and in others the amount of smut was negligible. The results indicate that either a multiple infection occurs or that there is a mass effect due to numbers of spores.—*B. B. Higgins.*

546. HERNHEIMER, GOTTHOLD. Über den "Reiz", "Entzündungs"- und "Krankheits"-Begriff. [Irritation, inflammation, and disease concepts.] *Beiträge Path. Anat.* 65: 1-78. 1919.—The author gives a lengthy discussion of the use of these terms in human pathology, drawing upon physiological and pathological phenomena in animals and plants to bring out clear concepts and arrive at exact definitions.—*Louise Dordall.*

547. KUWATSUKA, KIKUJI. Some studies on the *Pseudomonas pruni* E. F. Smith. *Ann. Phytopath. Soc. Japan* 14: 12-19. 1921.—*Prunus* and other rosaceous plants (16 genera including 44 species) were inoculated. The experiments were repeated 3 times, the 1st inoculations being on May 20, the 2nd May 31, and the 3rd June 19. Practically all species of *Prunus*, both cultivated and wild, and *Sorbus japonica* were found susceptible. The following new hosts were found: *Prunus Buergeriana* Miq., *P. cerssipes* Koidz., *P. donarium* Sieb. subsp. *elegans* Koidz. var. *glabra* Koidz., *P. Hosakura* Koidz., *P. japonica* Thunb., *P. Mume* S. and Z., *P. Mume* S. and Z. var. *microcarpa* Mak. and var. *Bungo* Mak., *P. triflora* Roxb., and *Sorbus japonica* Koehne. Canker-like or sunken spots were formed usually on stems of *Prunus*, while on *S. japonica* small galls developed at the point of inoculation. The organism hibernates in the infected tissue of twigs with no loss of viability. From a study of the influence of soil moisture upon infection the author concludes that soil moisture is important through its influence on opening the stomata. More spots per leaf were obtained on plants grown in well watered soil than on plants grown on soil sparingly watered.—*L. M. Massey.*

548. LEONIAN, LEON H. Studies on the Valsa apple canker in New Mexico. *Phytopathology* 11: 236-243. 1921.—A canker of the twigs, branches, and trunks of apple trees, common throughout New Mexico, was proved to be due to *Valsa leucostoma*. Both perithecia and pyrenidia of this fungus were found on the cankered areas, and the disease was reproduced by inoculating wounded twigs and branches with spores of the fungus. Healthy trees were not attacked, but the cankers spread very rapidly on trees weakened by borers or by woolly aphis. The relationship of the 2 spore forms was demonstrated in cultures. Cultures from either source gave rise to both perithecia and pyrenidia on certain media. Perithecia were not formed on plain oat-meal agar, but, when either cane sugar or sodium chloride was added before inoculation, perithecia were produced in abundance.—*B. B. Higgins.*

549. MCKAY, M. B. Transmission of some wilt diseases in seed potatoes. *Jour. Agric. Res.* 21: 821-848. *Pl.* 139-141. 1921.—In western Oregon *Verticillium albo-atrum* is more important than *Fusarium oxysporum* as a cause of wilt in potatoes (*Solanum tuberosum*). Both organisms are likely to be present in the vascular region of stem-ends of tubers taken from diseased plants, their presence being commonly indicated by discoloration of the tissue.

An average of 6.6 per cent of the tubers infected with *V. albo-atrum* were not discolored.—*Fusarium radicola* is often found in stem-ends of tubers although it is not known to cause disease. This organism also causes a discoloration, usually more pronounced than that accompanying *V. albo-atrum* and less pronounced than that accompanying *Fusarium oxysporum*; but this is not a diagnostic character.—Several other organisms, some parasitic and others not known to be parasitic, were isolated from stem-ends; all are likely to be accompanied by discoloration. The longer tubers are held in storage the more abundant becomes the fungus flora of stem-ends.—Browning of the stem-end is neither an index of infection nor of invasion. Of the tubers examined, 55 per cent of those showing browning were either sterile or yielded non-parasitic organisms, while 22 per cent of those not discolored yielded parasitic forms.—*V. albo-atrum* is more likely to be found in small tubers than in large ones but the 2 species of *Fusarium* seem to occur indiscriminately. *V. albo-atrum* is transmitted to progeny to the extent of 30-50 per cent, while the *Fusaria* were transmitted only to a slight extent. The latter organisms apparently occur in soils in which potatoes have not been grown for several years.—Stem-end seed pieces of tubers affected with *V. albo-atrum* do not yield a higher percentage of wilted plants than do corresponding eye-end pieces.—The yield of plants affected with Verticillium wilt is reduced from 30 to 50 per cent. The disease is particularly troublesome in the seed plot, where its presence prevents certification for seed purposes.—*Fusarium oxysporum*, although widely distributed, causes little damage. *F. radicola* also occurs frequently but seems to cause no ill effects. A stem-end rot which may be dry or soft and jellylike is mentioned but the cause is not known.—D. Reddick.

550. SMITH, J. HENDERSON. The killing of Botrytis spores by phenol. Ann. Appl. Biol. 8: 27-50. 1921.—The length of time for which spores of *Botrytis cinerea* may be exposed to 0.4 per cent phenol and retain viability varies from a few minutes to 2-3 hours. All are killed by 0.6 per cent phenol in 30 minutes, and by 0.7 per cent in about 15 minutes. The curve showing number of spores surviving 0.4 per cent phenol at different times has a sigmoid shape. The curve becomes less sigmoid and approaches the logarithmic type (1) if the strength of phenol is progressively raised, (2) if the number of spores in the suspension is progressively decreased, (3) if increasingly younger spores are used.—P. Brierly.

551. WALKER, J. C., and L. R. JONES. Relation of soil temperature and other factors to onion smut infection. Jour. Agric. Res. 22: 235-261. Pl. 25-27. 1921.—Smut (*Urocystis cepulae*) of onion (*Allium cepa*) is widely distributed in the northern U. S. A. The disease is not established in the southern states although the organism has an equal chance of being carried there and the varieties grown are susceptible to the disease. Seedling onions are found to be susceptible to smut for a period of about 3 weeks, which corresponds with the time of maturing of cotyledonary tissues. If this tissue is removed the plants are again susceptible.—Experiments with different soil moisture conditions show that infection occurs at all soil moistures favorable for germination and growth of seed. Other conditions being favorable, onion seeds germinate and grow at constant soil temperatures ranging from 10 to 31°C., with the optimum at 20-25°. When soil infested with spores of the fungus is used, a high percentage of infection is secured at soil temperatures ranging from 10 to 25°. A decided reduction in amount of infection occurs at 27° and complete freedom from disease at 29°. The air temperature in the experiments ranged from 15 to 20°.—When plants, recently infected under favorable conditions, are exposed to air and soil temperatures of 30-33° the fungus development is checked so that if plants are removed after 12-15 days to a temperature favorable for infection the lesions usually fail to develop further and the plants remain free from further invasion.—High air temperature alone is not sufficient to check infection and the development of lesions. It is thought that the failure of lesions to develop at high temperatures is caused by a marked disturbance of the metabolism of the host and not simply by the direct effect of the high air temperature on the fungus in the aerial parts of the seedling.—Comparison of the development of lesions on plants grown at low temperature, 15-20°, and at high temperatures (soil and air), 24-28°, shows that at the higher temperature the plant is likely to outgrow the disease although the cotyledons become infected in either case. This is attributed to a more

rapid rate of top development at the higher temperature which results in sloughing off of the cotyledon before the fungus has penetrated to the 1st true leaf.—Successive plantings of onion seed in infected soil out of doors at Madison, Wisconsin, showed a gradual decrease in percentage of infection as the soil temperature increased. Complete freedom from infection was attained when the daily mean soil temperature in the upper 2 inches remained at or slightly above 29° for 2-3 weeks.—Records in a southern onion growing section show that the mean air temperature during the critical period for smut infection is above that at which complete inhibition of infection was attained in the experiments. It is concluded that the regional distribution of onion smut in the U. S. A. is conditional upon the soil temperature during the seedling development of the host.—*D. Reddick.*

552. WATERHOUSE, W. L. On the supposed occurrence of seedling infection of wheat by means of rusted grains. *Ann. Appl. Biol.* 8: 81-82. 1921.—Investigations were undertaken to determine whether or not seedlings of wheat became infected with stem rust, *Puccinia graminis tritici*, from rusted grains. One portion of rust-infected grains was subjected to hot water treatment, the other left untreated; for control a similar portion of healthy grains was treated. Sections of the seedlings were made from time to time. No rust hyphae were found, but mycelium of *Fusarium* and *Helminthosporium* occurred. Plants were under observation for 3 months. The author concludes that rust mycelium in wheat grains is extremely unlikely to bring about infection, and that the mycelia of other fungi so often present in developing plants may be mistaken for that of rust.—*J. J. Christensen.*

THE HOST (RESISTANCE; SUSCEPTIBILITY; MORBID ANATOMY AND PHYSIOLOGY)

553. ASHBY, S. F. Two diseases of the coconut palm in Ceylon. *Agric. News* [Barbados] 20: 190 1921.—This is a review of an article by F. A. Stockdale in the *Tropical Agriculturist* (Feb., 1921) dealing with (1) nut-fall and leaf-droop and (2) leaf-break.—*J. S. Dash.*

554. DERLITZKI, G. Untersuchungen über Keimkraft und Triebkraft und über den Einfluss von *Fusarium nivale*. [Investigations on viability and vigor and on the influence of *Fusarium nivale*.] 68 p., 40 diagr. (Inaug. Diss. Giessen) Friedrich Stollberg: Merseburg, 1917.—The author emphasizes the fact that the ordinary seed germination test does not afford a safe basis for determining behavior of seed under natural soil, moisture, and temperature conditions. Seed tested within a few days after harvest germinated more promptly and in higher percentage at relatively low temperatures (13-15°C.) than at 20°C. In testing viability of the seed seedling vigor also should be considered. The author recommends quartz sand as the most desirable medium for testing both germinability and vigor. The 7th day should be selected to determine seedling vigor and the 12th to determine germinability at ordinary room temperature. Germinability and subsequent seedling vigor slowly increase as the seed ages. The rate of increase is slower in wheat than in oats, barley, or rye. The difference between germinability and seedling vigor can not be attributed solely to the presence of *Fusarium nivale*, as other inhibitive factors must be considered, e. g., faulty harvesting, poor storage, and fungus infection. Beet seed does not always respond satisfactorily to the test applied to cereal seeds because the seedlings suffer so much from *Plasma* infection.—*H. B. Humphrey.*

555. DUCOMET, V. La résinose du topinambour. [Resinose of *Helianthus tuberosus*.] *Bull. Soc. Path. Vég. France* 8: 64-65. 1921.—Small quantities of oleoresin occur in normal tubers of *Helianthus tuberosus*. Large quantities may be secreted by some tubers which oxidize into bitter, yellow, resinous material and form spots in the parenchyma. The disease is reported to spread from affected to neighboring healthy tubers.—*Jean Dufrenoy.*

556. FOËX, E. A propos de la gelée du 16 avril. [Effect of frost on the 16th of April at Crignon.] *Bull. Soc. Path. Vég. France* 8: 77-80. 1921.—A temperature of -5°C. was very

harmful to flower buds of fruit trees. The perianth resisted better than the sexual organs and the androecium better than the gynoecium. When ovule and placenta, the most sensitive organs, are killed they are resorbed and the placental cavity is filled either by hypertrophied border cells or by growth developed from meristematic tissue. This cicatrization permits the young pear, castrated by frost, to pursue a parthenocarpic development.—*Jean Dufrenoy*.

557. FOËX, E. Particularités présentées par un champignon de couche atteint de "Molle," *Hypomyces perniciosus*. [Alterations of *Psalliota campestris*, caused by the "Molle" disease due to infection by *Hypomyces perniciosus*.] Bull. Soc. Path. Vég. France 8: 105-106. 5 fig. 1921.—Partial and tardy attack by *Hypomyces perniciosus* causes a unilateral hypertrophy of the pileus of *Psalliota campestris*. The parasite forms spores on the deformed lamellae and sends its mycelium into the tissues of the stalk which turns brown.—*Jean Dufrenoy*.

558. HOWARD, ALBERT. The influence of soil factors on disease resistance. Ann. Appl. Biol. 7: 373-389. 5 fig. 1921.—Experiments at Pusa and Bihar show that the typical indigo wilt may be produced by defective soil aeration. The monsoon period and its relation to sub-soil water and aeration are discussed. Shallow rooted varieties were found to thrive where deep rooted varieties did not. Injured root systems are figured.—Plants weakened by poor aeration were more readily attacked by fungi than normal ones. Resistance of wheat to *Puccinia graminis* is said to be influenced by soil aeration, as is also resistance of flax to *Melampsora lini*, and of sugar cane to *Colletotrichum falcatum*. Aeration is also considered important in aphid injury to almonds, peaches, and nectarines. Soil temperature above the maximum for growth is said to render wheat seedlings more susceptible to attacks of termites.—*C. R. Hursh*.

559. KULKARNI, G. S. The susceptibility of Dwarf Milo sorghum to smut. Phytopathology 11: 252. 1921.—By planting seed of Dwarf Milo sorghum (*Sorghum vulgare*) artificially inoculated with spores of grain smut (*Sphaerobothra sorghi*) and of loose smut (*S. cruenta*) it was found that this plant is resistant but not immune to grain smut and decidedly susceptible to loose smut.—*B. B. Higgins*.

560. LEVY, E. BRUCE. Dry rot of swedes investigation. New Zealand Jour. Agric. 21: 233-243. 11 fig. 1920.—Slow maturing roots appeared more resistant than quick growing ones. Closely grown, small roots were less injured than well spaced, large ones. Spraying with Bordeaux reduced the amount of disease. Seedling infection occurs around the crown, and later infections are mostly above ground. There was no indication that the disease was carried over on wild hosts.—*N. J. Giddings*.

561. MOLLARD, M. Sur une tumeur du collet chez le *Rhizanthus minor*. [Basal stem tumor of *Rhizanthus minor*.] Bull. Soc. Path. Vég. France 8: 70-72. 1921.—Black, spindle-shaped galls occurred at the base of many stunted shoots of *Rhizanthus minor*. Sections show dense mycorrhiza-like mycelial growth infecting the external layer of the cortex. Inner cortex, phloem, and xylem, although never infected, react through hypertrophy and hyperplasia of cells. The causal organism is supposed to be a *Verticillium*, which was repeatedly isolated from these mycoccidia.—*Jean Dufrenoy*.

562. PAINE, SYDNEY G., and EMILY M. BERRIDGE. Studies in bacteriosis V. Further investigation of a suggested bacteriolytic action in *Protea cynaroides* affected with the leaf-spot disease. Ann. Appl. Biol. 8: 20-26. 1921.—The authors failed to confirm the suggestion in a former paper that a bacteriolytic action is produced by the cells of *Protea cynaroides* against the organism *Pseudomonas proteanum* which causes a leaf spot disease. The bacteria enter the leaf through the stomata. Local infections on the leaf are prevented from increasing in size by the formation of wound cork. The organism succumbs very readily to the desiccation conditions which exist in the invaded cells, as these are cut off from water supply by the development of wound cork.—*J. J. C. Giddings*.

563. SALMON, E. S. On forms of the hop (*Humulus Lupulus* L. and *H. americanus* Nutt.) resistant to mildew (*Sphaerotheca Humuli* [DC.] Burr.). Ann. Appl. Biol. 6: 293-310. 1920.—Inoculation experiments were made with hop mildew (*Sphaerotheca Humuli*) on several forms of *Humulus Lupulus*. One form (female) proved persistently immune both in the greenhouse and in the open. A 2nd form (female) proved slightly susceptible in the greenhouse, while a 3rd (male) proved susceptible both in the greenhouse and in the open. Certain seedlings raised from the immune female, Golden Hop, male parent unknown, possessed green leaves and were immune to mildew in the greenhouse. Seedlings of the wild *H. lupulus* manifested various degrees of susceptibility which were constant under the same environment. Certain of these seedlings, however, which were immune in the greenhouse were susceptible when grown in the open. This breaking down of immunity was considered due to certain climatic conditions. In the majority of cases greenhouse conditions did not render seedlings of the wild hop immune. Certain seedlings of various origins were semi-immune. The male form of *H. americanus* obtained from the U. S. A. proved immune under greenhouse condition under which similar cultivated American varieties proved susceptible.—J. G. Leach.

564. SALMON, E. S., and H. WORMALD. Varietal resistance to American gooseberry mildew in red currants. Gard. Chron. 70: 47. 1921.—In a plantation at Wye College, Kent, England, during an unusually severe outbreak of this disease (*Sphaerotheca mors-uae*), certain bushes of Fay's prolific variety remained free from disease.—P. L. Ricker.

565. SMITH, KENNETH M. Investigations of the nature and cause of the damage to plant tissue resulting from the feeding of capsid bugs. Ann. Appl. Biol. 7: 40-55. 1920.—*Plasmodius rugicollis* produces death of the tissue surrounding each puncture in the leaves made in feeding and produces great distortions and russetting of the fruit. That the injury is a purely mechanical one produced by the insect's stylets in the process of sucking was disproved. The theory that the bug acts as a "carrier" of bacteria, injecting these into the plant along with the saliva and thus setting up a pathological state, was discredited by microtome sections of damaged plant tissue and of the salivary glands of the bug which showed no bacteria. On the other hand, it was shown by several experiments and by observations that the injury is due to the injection of some violently toxic secretion from the salivary glands. A list of common plants with their various reactions to the feeding of harmful bugs is also given.—H. D. Barber.

DESCRIPTIVE PLANT PATHOLOGY

566. ANONYMOUS. De Aardappelwratziekte in Nederland [Potato wart disease in Holland]. Verslag, en Mededeel. Phytopath. Dienst Wageningen 16. 18 p., 5 pl. 1920.

567. ANONYMOUS. Plantenziekten waarmede rekening moet worden gehouden by de veldkeuring. [Plant diseases which must be considered in the field selection of crops.] Verslag, en Mededeel. Phytopath. Dienst Wageningen 11. 11 p., 3 pl. 1920.—The more important diseases of field crops are described briefly. Those persisting in the soil are described under a special heading.—D. Atanasoff.

568. ANONYMOUS. Ricerche e studi compiuto o in corso presso la R. Stazione di Patologia Vegetale. [Researches and investigations completed or in progress at the royal station of vegetable pathology (Rome).] Boll. Mens. R. Staz. Patol. Veg. 1: 50-51, 101-102. 1920 [1921].—Abstracts of the following subjects are presented (only those which seem not to have been published are mentioned here): Overwintering of *Marasmius jaglandis* on branches of walnut; *Asterocystis radialis* in the roots of tobacco; gloeosporiose of *Ilex* (holn oak); soil sickness; a disease of *Iris* caused by *Septoria iridis*; 2 interesting mycocecidia from Somaliland.—D. Reddick.

569. BRYCE, G. Brown bast and the rubber plant. Nature 108: 81-82. 1921.—The author cites earlier references to the inclusion of latex vessels in the cores of nodules. Formation of these nodules after brown bast is generally recognized as a secondary symptom.

though it also occurs in many other cases. Occurrence of diseased sieve tubes in brown bast tissue prior to appearance of the disease in or adjacent to the latex vessels is new, and if corroborated may lead to further advance in knowledge of the disease. The statement that the diseased lactiferous tissue is enclosed in "stone-cell pockets" formed by wound cambiums is not in accord with the findings of most workers in the East.—O. A. Stevens.

570. BUTLER, E. J. Fungi and disease in plants. An introduction to the diseases of field and plantation crops, especially those of India and the East. iv + 547 p., 4 pl. (colored), 201 fig., 18 X 25 cm. Thacker, Spink & Co.: Calcutta and Simla, India, 1918.—In a handbook of crop diseases of India and the tropics (in part), the author condenses the results of both field and laboratory studies dealing with nearly 200 plant pathogens. The 1st part of the book (pp. 1-147) covers general plant pathological topics, as follows: The nature of fungi; food of fungi; life history of parasitic fungi; causation of disease by fungi; principles of control of plant disease. The 2nd part is devoted to special diseases of the following crops: (1) Cereals (wheat, oats, barley, maize, sorghum (jowar), bajra (*Pennisetum typhoides*), rice, millet (*Setaria italica*), *Panicum miliaceum*, *P. miliare*, *P. frumentaceum*, *Cenchrus lachrymans*-Jobi); (2) pulse crops, —pigeon pea (*Cajanus indicus*), field or garden peas, beans, cowpea (*Vigna catjang*); soybean (*Glycine hispida*); *Dolichos lablab*, *D. biflorus*, *Lathyrus sativus*, *Lens esculenta*, *Mucuna* and *Sesolobium* spp., *Cicer arietinum*, *Cyamopsis psoraloides*; (3) vegetables, root crops, oil seeds, potato, *Brassica* spp. and allies, tomato, egg-plant, *Solanum melongena*, okra (*Hibiscus esculentus*), *Colocasia antiquorum*, cassava (*Manihot utilissima*), cucurbits, celery (*Apium graveolens*), Chua (*Amaranthus paniculatus*), *Chenopodium album*, purslane (*Portulaca oleracea*), peanut (*Arachis hypogaea*), flax (*Linum usitatissimum*), castor-oil plant (*Ricinus communis*); (4) dye, drug, and spice crops,—tobacco (*Nicotiana tabacum* and *N. rustica*), opium poppy (*Papaver somniferum*), tumeric (*Curcuma longa*), ginger (*Zingiber officinale*), garden pepper (*Capsicum annuum*), pepper (*Piper nigrum*), coriander (*Coriandrum sativum*), fennel (*Foeniculum vulgare*), fenugreek (*Trigonella foenum-graecum*); (5) fiber crops,—cotton, jute (*Cortecorus capsularis* and *C. olitorius*), Sann hemp (*Crotalaria juncea*), sisal (*Agave* spp.); (6) sugar cane (*Saccharum officinarum*); (7) tea (*Camellia thea*); (8) coffee (*Coffea* spp.); (9) rubber (*Hevea*, *Manihot*, *Castilloa*, *Ficus*).—An extensive bibliography is appended to each chapter and the book is indexed. The general chapters epitomize salient researches in phytopathology and seek to outline in a broad way the principles of the subject. The mycological relations are emphasized. The discussion of special diseases is full, giving consideration to disease relations in other countries as well as local instances of disease occurrence or severity. Technical descriptions are given as well as recommendations for control. The large number of crops and diseases considered precludes listing the latter.—G. H. Coombs.

571. COOK, MEL. T. The blossom blight of the peach. Phytopathology 11: 290-294. Pl. 12. 1921.—A blossom blight of peach produced by *Sclerotinia cinerea* was very serious in New Jersey during 1919 and 1920 though very few mummies and apothecia could be found in the affected orchards. Close study of these orchards has shown the most important source of infection to be small cankers formed on new growth during the previous season. The bark and wood of young twigs become infected, usually near the base of a bud. The canker spreads very slowly during the remainder of the season, but the following spring produces an abundance of conidia just before and during blossoming.—B. B. Higgins.

572. DODGE, ETHEL M. A tomato canker. Ann. Appl. Biol. 7: 407-430. 1921.—Spots on leaves and stems, and cankers in fruit, are caused by *Botrytis rostratorum* n. sp. This organism is motile by means of a single polar flagellum, liquefies gelatine, and produces round yellow colonies on nutrient agar. It is strictly aerobic, with a temperature growth range of 5-19°C. (optimum about 30°C.). The use of resistant varieties, seed sterilization, long crop rotation, and destruction of diseased parts at end of season are recommended as means of control.—C. R. Hursh.

573. FUKUSHI, TEIKICHI. A willow-canker disease caused by *Physalospora miyabeana* and its conidial form *Gloeosporium*. Ann. Phytopath. Soc. Japan 15: 1-11. Pl. 52. 1921.—

Leaves and stems of *Salix purpurea* var. *angustifolia* are affected. The lesions on the stems are whitish gray to gray, elliptical, and 5-30 mm. long. The stem may be girdled. On the leaves the disease appears on the upper surface as circular or irregular dark brown spots 2-5 by 3-7 mm. These spots often show concentric markings. The cause of the disease was found to be *Physalospora miyabiana* n. sp., of which the conidial form is a *Gloeosporium*. The relationship between the perithecial and conidial stages was established by cultural experiments.—*L. M. Massey*.

574. HAMBLIN, C. O. Over-wintering of spotted wilt of tomatoes. *Agric. Gaz. New South Wales* 32: 547. 1921.—The disease may persist in vines living through the winter.—*L. R. Waldron*.

575. HARTER, L. L., J. L. WEIMER, and J. I. LAURITZEN. The decay of sweet potatoes (*Ipomoea batatas*) produced by different species of *Rhizopus*. *Phytopathology* 11: 279-284. 1921.—Sweet potatoes of the Yellow Jersey variety were inoculated with 11 species of *Rhizopus*.—*R. nigricans*, *R. reflexus*, *R. chinensis*, *R. tritici*, *R. atocarpus*, *R. delemar*, *R. maydis*, *R. nodosus*, *R. oryzae*, *R. microsporus*, and *R. arrhizus*. A "well" was made in the potato and a young (24-48 hours) sweet potato decoction culture of the organism to be tested was poured into the well, which was then sealed up. After inoculation the potato was incubated at a temperature suitable for the growth of the fungus used. If decay appeared at the point of inoculation, an isolation was made and the species causing the decay determined. All species tested except *R. chinensis* and *R. microsporus* proved parasitic on sweet potato.—*B. B. Higgins*.

576. HORNE, ARTHUR S. Phloem necrosis (brown bast disease) in *Hevea brasiliensis*. *Ann. Botany* 35: 457-459. 1921.—Brown bast, a disease attributable to physiological causes, is the most serious trouble to which the Para rubber plant is subject. The disease, which is manifested by cracking of the bark, and nodular swellings near the base of the tree and on the lateral roots, has its origin in the phloem as a type of necrosis. Degeneration of the surrounding parenchyma, medullary ray cells, and laticiferous vessels follows, with diminution or cessation of latex flow.—*C. W. Bennett*.

577. HORNE, ARTHUR S., and ELEANOR VIOLET HORNE. Mycological studies. I. On the "spotting" of apples in Great Britain. *Ann. Appl. Biol.* 7: 183-201. 6 fig. 1920.—The spotting of apples and the causal organisms involved have been studied since 1915. Fungi constantly associated with "spotting" were artificially inoculated upon many apple varieties and re-isolations were made. A new genus of Phomatales (*Polyopeus*), and a new species, *Pleospora pomorum*, were found capable of parasitizing apples.—*E. B. Lambert*.

578. HOWARD, ALBERT, and G. L. C. HOWARD. Some aspects of the indigo industry in Bihar. Part I. The wilt disease of indigo in Bihar. Part II. The factors underlying the seed production and growth of Java indigo. *Mem. Dept. Agric. India. Bot. Ser.* 11: 1-36. 1920.—Data are given relative to the wilt disease of Java indigo (*Indigofera arrecta*), which was largely responsible for the drop in acreage from 70,000 to 15,000 bighas (1/3 to 1/5 of an acre) between 1910 and 1914 in Bihar, India. Neither insects, fungi, nor bacteria have been shown to be responsible. The investigations here presented are taken to indicate that the wilt arises from the destruction of the fine roots and nodules when regeneration is difficult or impossible. At the 1st cutting of the crop the fine roots and nodules are destroyed. If soil aeration is sufficient to permit root regeneration an excellent 2nd crop is produced. The wilt of old indigo plants in November and December is due to the fact that the surface roots, developed as a result of late rains, suffer from lack of water as the ground dries out. The advent of cold weather prevents formation of new roots. Careful seed selection and improved drainage are recommended. Since a surface-rooting, rapidly growing plant resistant to water-logging is required, directions for home production of seed are given.—*G. H. Coons*.

579. JONES, L. R., and S. P. DOOLITTLE. Angular leaf-spot of cucumber. Phytopathology 11: 297-298. 1921.—Angular leaf-spot developed on cucumber plants growing in soil which had never grown cucumbers before, indicating that the causal bacterium (*Bacterium lachrymans*) overwintered on the seed.—B. B. Higgins.

580. KOCH, ELIZABETH, and CAROLINE RUMBOLD. Phoma on sweet sorghum. Phytopathology 11: 253-268. Pl. 9-11, 3 fig. 1921.—A phoma disease of leaves, seed heads, and seed of sweet sorghum has been found in several widely separated localities of the U. S. A. On the leaves the pycnidia resemble fine dust on the surface of the more or less discolored areas. On the seed the diseased areas are not discolored. The causal fungus was isolated from several different collections and its parasitism proved by inoculations on seedlings of several varieties of sorghum. No variety of sorghum was found immune. Inoculations on grain sorghum, sugar cane, and corn (*Zea mays*) gave positive infection. Comparison of cultural characters and inoculation tests of the various isolations revealed no differences of specific value. The fungus is thought to be identical with *Phoma insidiosa*.—B. B. Higgins.

581. KÖCK, GUSTAV. Wesen und Bedeutung des Kartoffelkrebses. [Occurrence and importance of potato canker.] Oesterreich. Zeitschr. Kartoffelbau 1: 2-3. 1921.—This is a popular description of potato wart disease with particular reference to its distribution in German territory proximate to Austria, and to the development of immune varieties. Although the disease is as yet unknown in Austria, it occurs in old Bohemia and was reported in 1896 from Hungary. The shortage of potatoes in Austria necessitating large scale importations may result in introducing the disease. This would be a great calamity because Austria has no tested immune varieties, and Wohltmann, a susceptible variety, is widely cultivated.—F. Weiss.

582. KONING, M. DE. Plantenziekten en vreemde houtsoorten. [Plant diseases and exotic trees.] Tijdschr. Plantenz. 26: 213-215. 1920.—Numerous examples of diseases and pests of trees introduced in Holland are given. Exotic trees are divided into 4 groups: (1) Those which thrive, remain healthy, and replace native sorts; (2) those which introduce new diseases and pests, which attack native species; (3) those which suffer more or less seriously from native diseases and pests; and (4) those which are not adaptable to the new conditions, and die from diseases which affect them but little in their native habitat.—H. H. Whetzel.

583. LEE, H. ATHONTON. Black spot of citrus fruits caused by *Phoma citricarpa* McAlpine. Philippine Jour. Sci. 17: 635-641. Pl. 1-4. 1920.—Black spot (*Phoma citricarpa*) has been observed throughout southern China, but has not yet been found in Japan or America. The disease causes a black bluish on the fruits, but does not attack leaves and twigs.—Albert R. Seectser.

584. MANNS, T. F., and J. F. ADAMS. Prevalence and distribution of fungi internal of seed corn. Science 54: 385-387. 1921.—Culture methods are given for the growth and isolation of the several forms found to be transmitted within the kernel. These fungi do not inhibit germination unless they are established in the tissue of the embryo. The order of importance for such inhibition seems to be *Diplodia zeae*, *Gibberella saxibunctii*, *Fusarium moniliforme*, and *Cephalosporium sacchari*. The latter is here reported for the 1st time as a parasite of corn in the U. S. A.—A table gives statistics on seed samples from 21 states as to fungi found and strength of seed germination.—C. J. Lyon.

585. MAYOR, E. Étude expérimentale de *Melampsora Abieti-Capraearum* Tubeuf. [Experimental study of *Melampsora Abieti-Capraearum*.] Bull. Trimest. Soc. Mycol. France 36: 191-203. 5 fig. 1920.—This fungus is found to form its pycnidial and caecoma stages on the needles of 4 species of *Abies*. The uredo- and teleutospores are found in nature on *Salix Caprea*. The author was able to infect 5 other species of *Salix*.—D. S. Welch.

586. NICHOLLS, H. M. Annual report of the government microbiologist. Rept. Agric. and Stock Dept. Tasmania 1920-21: 10-13. 2 pl. 1921.—Club root (*Plasmodiophora*) of cabbage seems to be increasing in extent. *Plasmodiophora humuli* on hops is reported. The direct microscopic examination of milk as proposed by Breed is favorably reported.—*Phytophthora infestans* in potato tubers is killed by dry-heating tubers 4 hours at 104°F. In 1919, enough tubers were treated for 4 hours at 125°F. to plant 1 acre. The yield was greater than from untreated tubers by 1.4 tons to the acre. Part of the progeny was planted in 1920 without further treatment.—D. Reddick.

587. NISHIKADO, Y. On a disease of the grape cluster caused by *Physalospora baccæ* Cavara. Ann. Phytopath. Soc. Japan 14: 20-42. 1 pl. 1921. [Text in Japanese; abstract from English summary, pp. 39-40.]—This disease, prevalent the past 10 years in Okayama prefecture and in a few other places, affects peduncles, pedicels, and berries of *Vitis vinifera*. The pyrenidial stage of the fungus is identical with *Macrophoma reniformis* (Viala et Ravaz) Cavara, the perithecial stage with *Guignardia baccæ* (Cav.) Jaczewski (the perithecial stage of *Macrophoma reniformis*) except for the existence of paraphyses in the form studied by the author. Therefore, the name *Physalospora baccæ* Cavara is adopted in this report instead of *G. baccæ*. Although the pathogenicity of the fungus has been proved by earlier workers, inoculation experiments conducted by the author led to no conclusions.—L. M. Massey.

588. OSTERWALDER, A. *Phacidella discolor* (Mont. et Sacc.) A. Poteb. als Fäulnispilz beim Kernobst. [*Phacidella discolor* as a rot fungus on pomaceous fruit.] Centralbl. Bakt. II. Abt. 52: 373-375. 1920.—This is a brief description of a new rot-producing fungus of minor importance on fruit in storage. A. Potebina previously called attention to this fungus as producing canker on apple trees.—Anthony Berg.

589. PETHYBRIDGE, GEO. H., H. A. LAFFERTY, and J. G. RHYNEHART. Investigations on flax diseases. (Second report.) Jour. Dept. Agric. Ireland 21: 167-187. Fig. 1-13. 1921.—This is a report on work in 1920 on certain diseases and insect pests of *Linum usitatissimum*. Seedling blight (*Colletotrichum linicolum*) is transmitted by seed infected from diseased fruits, to which infection comes from the leaves. Browning or stem-break (*Polyspora lini* n. gen., n. sp.), characterized by lignification of stem fibers near diseased areas of the cortex, is transmitted by seed but is not controlled by deep sowing, seed treatments (chemical, heat), long storage, or varietal selection of seed. Rust or firing (*Melampsora lini*) is controlled by seed cleaning. Attacks by *Phoma* sp. (foot-rot), *Fusarium lini* (wilt), *Botrytis* sp., *Sclerotium sclerotiorum*, and *Cuscuta epilinum*, and yellowing (lack of soil fertility or aeration) were not common.—Donald Folsom.

590. RICHARDS, B. L. A dryrot canker of sugar beets. Jour. Agric. Res. 22: 47-52. Pl. 4-9. 1921.—Circular, brown lesions 2-15 mm. in diameter were found on sugar beets [*Beta*] in Utah. The lesions extend deep into the tissue. *Corticium vagum* is present in the lesions and inoculations with this organism through wounds gave infection. Natural infection takes place below the soil line but crown rot may appear as a result of internal development.—D. Reddick.

591. RIZA, Ali. Sur une maladie nouvelle d'amandier. [A new disease of the almond.] Bull. Trimest. Soc. Mycol. France 36: 189-191. 1 fig. 1920.—*Cercospora amygdali* n. sp., causing a disease of shoots of the almond in Halkali, Turkey-in-Europe, is described. D. S. Hitch.

592. SALMON, E. S. The potato "blight" fungus on tomatoes under glass in April. Gard. Chron. 69: 311-312. 1921.—A diseased tomato received from Bath, England, in May bore fructifications of a fungus indistinguishable from *Phytophthora infestans*, a disease previously rare on tomatoes grown in greenhouses. The early appearance of the disease suggested the possibility that such outbreaks are responsible for early outbreaks of potato blight, though

Phytophthora infestans from tomatoes is supposed not to infect potatoes readily. Young tomato leaves were inoculated with zoospores from tomato stems in a moist chamber; the 48 inoculations produced infection in every case. Leaves of potato plants were then inoculated in the same way, the spots marked and the plants kept under bell-jars; 144 inoculations were made on leaflets from 18 leaves of 3 plants. On 1 plant 40 inoculations produced 40 infections. On 2 other plants only 1 inoculation out of 40 and 64 respectively failed. These results are contrasted with previously published work with more or less negative results, and it is suggested that when early outbreaks of tomato blight occur steps should be taken to keep it under control.—P. L. Ricker.

593. SANDERSON, A. R., and H. SUTCLIFFE. *Sphaeronema* sp. (mouldy rot of the tapped surface). Ann. Appl. Biol. 7: 56-64. 1920.—The authors point out that Belgrave and de la Mare Norris suggested but did not definitely determine that the cause of the "mouldy rot of recently tapped surface" of the rubber tree was *Sphaeronema*. The authors' experiments in isolation, culture, and inoculation seem definitely to establish *Sphaeronema* sp. as the causal organism of this, the most serious bark disease of *Hevea*. The fungus and its effects are described and illustrated. Deep tapping seems to aid in thoroughly establishing the fungus, as it makes penetration easier. When reopening trees after a period of rest due to moldy rot, the new cut, if in the same section, should be 4 inches below the old one; it is better, however, to open a new section and keep a sharp watch for any new infection.—H. D. Barker.

594. SAVASTANO, L. Note di patologia vegetale. [Notes on plant pathology.] Ann. R. Staz. Sper. Agrumic. e Fruttic. Acireale 4: 187-208. Pl. 8-12. 1916-1918 [1919].—The notes (author's numbering) take up the following: (44) root rot of fig transmissible to olive; (45) degenerative bud-variation in Calabria oranges; (46) cracking of orange fruit; (47) abnormal fall flowering of orange; (48) "Brusca" in citrus fruit; (49) abnormal development of the lichen *Ramolina farinacea* on the trunk of hazel-nut; (50) traumatic thawing and sun-scald on frozen branches of hazel-nut; (51) atrophy ("blivellatura," "little olive") of olive fruit; (52) root decay of hazel nut. A bibliography and a list of previous notes (from 1897 to date) are appended.—A. Bonazzi.

595. SCHOEYERS, T. A. C., H. A. A. VAN DER LEK, en N. VAN POETEREN. Deloedglandsiekte onzer ooftboomen. [Silver leaf disease of our orchard trees.] Verslag en Mededeel. Phytopath. Dienst Wageningen 10. 12 p., pl. 1-2. 1920.—The disease and its distribution are briefly described, as are the fruiting bodies of the causal organism, *Stromium purpureum*. As preventive measures, immediate removal and destruction of diseased trees and portions of trees are recommended.—D. Atanasiu.

596. SHAPOVALOV, M., and H. A. EDSON. Blackleg potato tuber-rot under irrigation. Jour. Agric. Res. 22: 81-92. Pl. A colored and 12-16. 1921.—In certain irrigated sections of the western U. S. A. a disease of potato tubers is found which has been confused with sun scald, freezing injury, jelly end rot, and leak. Disintegration originating at one end of the tuber advances irregularly over the tuber. In summer the lesions are soft and wet but in winter they are tough and dry or shrunken. The disease is caused by *Beauveria phytophthora*, of which the morphological, cultural, physical, and biochemical features are presented. Extensive infection experiments in laboratory, greenhouse, and field prove the pathogenicity of the organism and the identity of the disease.—D. Reddick.

597. STEVENS, F. L., and J. G. HALL. Diseases of economic plants. Revised edition by F. L. Stevens. xii + 507 p., 238 figs. Macmillan Co., New York. 1921.—The writer, following closely the plan of the 1910 manual, has prepared "a textbook designed primarily for college students, but it is hoped that it may serve also as a useful handbook for others who may wish to recognize plant diseases or to apply treatments." A brief history of the development of plant pathology is followed by a short discussion of the damage caused by plant diseases. Various control practices are classified under 13 heads. General diseases attacking a series

of hosts are briefly discussed with references to pertinent literature. The greater part of the book is given over to brief popular discussions of crop diseases, arranged as follows: Pomaceous fruits, drupaceous fruits, small fruits, tropical fruits, vegetable and field crops, cereals, forage crops, fiber plants, trees and timber, ornamental plants. A chapter is devoted to fungicides and spraying apparatus and another to soil disinfection. The book closes with a list of the literature cited in the text and an index.—*G. H. Coons.*

598. SUBRAMANIAM, L. S. A *Pythium* disease of ginger, tobacco and papaya. Mem. Dept. Agric. India Bot. Ser. 10: 181-194. Pl. 6. 1919.—This disease attacks at the collar of the plants, rapidly developing into a rot which causes the leaves to yellow, wither, and die. The causal organism, for which the name *Pythium Butleri* n. sp. is proposed, has been found on *Nicotiana tabacum*, *Zingiber officinale*, *Carica papaya*, and *Capsicum annuum*, and will infect *Solanum tuberosum* and *Ricinus communis*. Destruction of infested material is said to control the disease.—*C. W. Bennett.*

599. THOMAS, R. C. Botrytis rot and wilt of tomato. Monthly Bull. Ohio Agric. Exp. Sta. 6: 59-62. 3 pl. 1921.—This is a report of investigations of the rot of tomato fruits and wilt of the vine caused by *Botrytis* sp. The disease is found on tomatoes grown under glass and has its greatest development under conditions of high humidity and a relatively high temperature (75-80°F.). The disease is not serious in well ventilated greenhouses.—*R. C. Thomas.*

600. WEIR, JAMES R. *Cenangium piniphilum* n. sp., an undescribed canker forming fungus on *Pinus ponderosa* and *P. contorta*. Phytopathology 11: 294-296. Pl. 18, fig. 1-2. 1921.—Infection usually occurs at a node, but the fungus attacks the internode if the bark is injured. All tissues of both bark and wood are penetrated by the mycelium, which forms a black deposit in the wood. This deposit, with the abundant growth of mycelium in the medullary tissues, gives the wood a characteristic grayish or bluish-black color. Apothecia are formed on the surface of the cankers.—*B. B. Higgins.*

ERADICATION AND CONTROL MEASURES

601. ANONYMOUS. Aardappelziekten waarmede rekening moet worden gehouden by de veldkeuring en by de selectie. [Potato diseases which must be considered in potato seed selection and breeding.] Verslag. en Mededeel. Phytopath. Dienst Wageningen 6. 29 p., pl. 1-6. 1920.

602. ANONYMOUS. Bestrijding van plantenziekten in kleine tuinen. I-II. [Controlling plant diseases in small gardens.] Verslag. en Mededeel. Phytopath. Dienst Wageningen 19. 17 p., 3 pl. 1921; 21. 15 p., 5 pl. 1921.—Efficient and easy treatments and precautionary measures for controlling the commonest plant diseases and insects in the small garden are briefly described.—*D. Atanasoff.*

603. ANONYMOUS. De Strepenziekte van de Gerst. [The stripe disease of barley.] Tijdschr. Plantenz. 27: 105-120. Pl. 1-7. 1921. [Also in Verslag. en Mededeel. Plantenziektenk. Dienst Wageningen 23. 18 p., pl. 1-7. 1921.] Following a discussion of one barley stripe disease (*Helminthosporium graminum*), the losses caused, and the susceptibility of various varieties, the author from his experimental evidence recommends: (1) Sprinkling and thorough mixing of the seed with copper sulphate solution (½ kgm. copper sulphate per 3 liters water for every hectoliter seed); (2) treating in same way with "Uspulun" (at least 1 per cent "Uspulun" solution, using 7 l. per hectoliter seed); (3) treating in same way with "Gernisan B 11" (4 per cent, using 3 l. solution per hectoliter seed).—*D. Atanasoff.*

604. ANONYMOUS. New preservative for wooden poles. Sci. Amer. Monthly 3: 476. 1921. [From NOWORNY. Elektrotechnik und Maschinenbau. Nov. 21, 1920.] This preservative, invented by Malenkovic consists of 88.89 parts of sodium fluoride and 11.11 parts of dihydrophenolamine (by weight).—*Chas. H. Allen.*

605. BERG, C. VAN DEN, RZN. Ontsmettingsproef tegen steenbrand bij tarwe. [Treating wheat against stinking smut.] Verslag, en Mededeel. Phytopath. Dienst Wageningen 18. 18-20. 1921. [See Bot. Absts. 9, Entry 429.]

606. BIRMINGHAM, W. A., and W. B. STOKES. Experiments for the control of *Armillaria mellea*. Agric. Gaz. New South Wales 32: 649-650. 1921.—The preparatory treatment of citrus trees consisted in careful root pruning and excision of all evidently diseased roots, followed by painting the exposed roots with various fungicides. After 3 years, only 2 trees (these only slightly affected at first) showed no spread of the fungus. The results are considered negative.—*L. R. Waldron*.

607. BURDICK, A. E. Troubles with orchard spray in the Northwest. Amer. Bee Jour. 61: 421. 1921.—The spraying of the bloom of orchards in the states of Washington and Oregon, U. S. A. in 1921, destroyed thousands of honey bees.—*J. H. Lovell*.

608. CARNE, W. M. The pre-soak method of treating seed wheat for bunt. Agric. Gaz. New South Wales 32: 626. 1921.—Pre-soaking as outlined by Braun was tested in treating samples of Hard Federation wheat. In one case the samples were treated respectively with copper sulphate and with formaldehyde; in another they were soaked before being treated with these fungicides. Grain was sown in moist soil and in dry soil watered after 1 week. Slight improvement was found in percent and rate of germination when the pre-soak method was used with copper sulphate, but no improvement resulted with formaldehyde.—*L. R. Waldron*.

609. DARNELL-SMITH, G. P. Fungicidal dusts for the control of "smut." Agric. Gaz. New South Wales 32: 796-798. 1921.—This article discusses the solubility of copper carbonate and its value as a fungicide. It has been found that CO_2 in the soil renders the copper carbonate present on the treated grain sufficiently soluble so that it acts lethally toward smut spores. The author also discusses injury caused in wheat by treating with copper sulphate. Literature is cited.—*L. R. Waldron*.

610. FOËX, E. Résultats fournis par les bouillies sans cuivre pendant la campagne 1921. [Results of spraying copperless mixtures on vines in 1921.] Bull. Soc. Path. Vég. France 8: 112-118. 1921.—A review is given of a number of recent papers on the fungicidal value of copper for the prevention of *Plasmopara viticola*. Aluminium sulphate has not been successful in practice.—*Jean Dufrénoy*.

611. HORNE, W. T., and E. O. ESSIG. Plant disease and pest control. California Agric. Exp. Sta. Circ. 227. 69 p. 1921.—This circular is a revised edition of circulars 204, Handbook of Plant Disease and Pest Control, by R. E. SMITH, E. O. ESSIG, and GEORGE P. GRAY.—*A. R. C. Haas*.

612. HUMPHREY, C. J., R. M. FLEMING, and E. BATEMAN. Studies on the toxicity of wood preservatives III. Jour. Indust. and Eng. Chem. 13: 618-621. 1921.—The advantages of the petri-dish method in determining toxicity of wood preservatives are discussed and the toxicity of various commercial preservatives is given. [See also Bot. Absts. 11, Entry 617.]—*Henry Schmitz*.

613. KÖCK, GUSTAV. Einiges über Kartoffelkonservierungsmittel. [Concerning means of preserving potatoes.] Oesterreich. Zeitschr. Kartoffelbau 1: 37-38. 1921.—Measures for the protection of potatoes in storage from rots due to *Phytophthora*, *Fusarium*, and bacteria are discussed. Sulphur has been shown to be ineffective in all scientifically controlled experiments. "Megasan K," a proprietary formic acid salt, has not been found satisfactory in experiments carried out in Germany. "Beka-Erdapfelschutz," a secret-formula compound, is claimed by the manufacturers to check the spread of rot and to stimulate germination, but

tests made at the Plant Protection Institute show that it is ineffective in both respects. "Us-pulunbolus" is produced by the dispensers of Uspulum and is a chlorphenol-mercury compound. Owing to its poisonous properties it can be used only on seed potatoes. Official tests failed to demonstrate any fungicidal value for it and sprouting was impaired, but it may be slightly effective in checking rot owing to its desiccating action. Fungicide manufacturers should persist in their efforts to devise really effective preserving materials for potatoes in storage. In the meantime nothing better can be recommended than customary sanitary measures in cleansing and disinfecting pits and bins, and sorting out all incipient rot before placing potatoes in storage.—*F. Weiss.*

614. MÜLLER, H. E., und E. MOLZ. Versuche mit Saatschutzmitteln. [Studies on seed disinfectants.] Landw. Jahrb. 52: 67-130. 1918.—The authors report results of experiments involving the use of various bird- and rodent-repelling preparations, such as "Corbin," "Antimyzel," "Antiavitgrün," "Floria seed-protector," and red lead. The tar preparations of commerce proved effective as bird-repellents but were quite unsatisfactory as preventives of bunt or stinking smut of wheat (*Tilletia* spp.), except a preparation designated coal-tar A + pyrol, which proved an effective preventive of bunt. Most of the coal-tar preparations showed varying degrees of control of stripe disease of barley and all were more effective than such fungicides as copper sulphate and formaldehyde. Of the tar oils the heavy raw oils are satisfactory as bird-repellents. Germinability is considerably reduced by raw tar oils, phenol-free tar oils, and base-free tar oil. The most important results of these experiments was the discovery of a preparation effective against the ravages of birds and of bunt of wheat and stripe disease of barley.—*H. B. Humphrey.*

615. PACK, A. N. Home building and wood preservatives. Amer. Forest. 27: 575-578. 9 fig. 1921.—Wood preservatives and methods and results of applying them are discussed.—*Chas. H. Otis.*

616. PRITCHARD, FRED J., and W. S. PORTE. Use of copper soap dust as a fungicide. Phytopathology 11: 229-235. 1921.—A copper-fish-oil soap was prepared by pouring a hot aqueous solution of either resin-fish-oil soap or potash-fish-oil soap of about the consistency of syrup into a saturated aqueous solution of copper sulphate. The resultant precipitate was dried in the air, ground, and applied as a dust. Compared with 4-4-50 Bordeaux mixture and with Sanders' Bordeaux dust for controlling *Septoria* leaf spot of tomatoes, this dust proved more effective than Sander's Bordeaux dust and equal to liquid Bordeaux. Furthermore, it is cheaper than liquid Bordeaux and much more easily and quickly applied.—*B. B. Higgins.*

617. SCHMITZ, HENRY, and S. M. ZELLER. The toxicity of various fractions and combinations of fractions of coal tar creosote to wood destroying fungi. Jour. Indust. and Eng. Chem. 13: 621-623. 1921.—The toxicity of the various fractions and combinations of fractions of coal tar creosote to *Lenzites saepiaria* and *Polyporus lucidus* is determined. Greater concentrations are necessary to inhibit the growth of the latter than of the former fungus. The toxic concentration also varies with the wood used as a culture medium. The 2 most toxic fractions are those which distill over between 235 and 270° and between 270 and 315°C. [See also Bot. Absts., 11, Entry 612.]—*Henry Schmitz.*

618. SMITH, ERWIN F., and R. E. B. MCKENNEY. Suggestions to growers for treatment of tobacco blue-mold disease in the Georgia-Florida district. U. S. Dept. Agric. Dept. Circ. 176. 3p. 1921.—*Peronospora* is reported on tobacco and on a weed in seed beds. Suggestions for control are seed-bed and field sanitation and spraying with bordeaux mixture.—*L. R. Hester.*

619. THOMAS, P. H. Annual report of the assistant fruit expert. Rept. Agric. and Stock Dept. Tasmania 1920-21. 18-19. 1921.—Iron sulphide and atomic sulphur were used for control of apple mildew caused by *Podosphaera oxycanthae* with satisfactory results. "Fum-

gol," a proprietary mixture, did not prove equal to Bordeaux mixture for control of apple scab. Spraying apple trees with nitrate of soda and caustic soda resulted in increased yield. —D. Reddick.

620. ZSCHOKKE. *Neuere Erfahrungen auf dem Gebiete der Schädlingsbekämpfung.* [New experiences in combatting injurious insects and diseases.] *Mitteil. Deutsch. Landw. Ges.* 36: 446-450. 1921.—The author discusses some of the newer methods of treating diseases and insects in orchards and vineyards. The possibilities in producing immune varieties are pointed out, but the paper deals mainly with spray materials. A new form of arsenic and lime prepared in cakes like chocolate is especially commended for efficiency and convenience. A few of the worst insect pests are discussed. The danger of phylloxera, which during the war appears to have become increasingly serious in Alsace, is emphasized.—A. J. Pieters.

MISCELLANEOUS (COGNATE RESEARCHES, TECHNIQUE, ETC.)

621. ANONYMOUS. *Verslag over de werkzaamheden van den Phytopathologischen Dienst in het jaar 1919.* [Annual report of the Phytopathological Service for the year 1919.] *Verslag en Mededeel. Phytopath. Dienst Wageningen* 12. 46 p. 1920.—In its 1st annual report (for the year 1919), the above institution gives a detailed account of its work covering the entire field of phytopathology. Extension pathologists will find this report of value.—D. Atanasioff.

622. ASHBY, S. F. Some recent observations on red ring disease of the coconut. *Agric. News [Barbados]* 20: 334. 1921.—The habits of the nematode causing this disease were studied as to resistance to desiccation, salt, etc., and movement of the larvae in water and on moist surfaces. Common salt apparently has a marked effect on the mobility of the worm, and suggestions are made as to using salt in preventing infection.—J. S. Dash.

623. BRUES, CHARLES T., and RUDOLPH W. GLASER. A symbiotic fungus occurring in the fat body of *Pulvinaria innumerabilis* Rath. *Biol. Bull.* 40: 299-324. 3 pl., 2 fig. 1921.

624. BYRRELL, B. A., and G. W. DOUGLAS. Presence of nitrates in leaves of trees growing near picric acid works. *Jour. Soc. Chem. Indust.* 40: 60T-61T. 1921.—Leaves of trees growing near munitions works shrivel and fall readily. Beeches suffer most, sycamores, elms, and oaks being more resistant. The air has a distinct odor of the oxides of nitrogen. Chemical examination of the leaves showed the presence of nitrates, whereas leaves not exposed to the fumes contained no nitrates.—G. B. Ray.

625. DUFRENOY, J. *Les effets de la gelée d'hiver à Arcachon.* [Effects of winter frost at Arcachon.] *Bull. Soc. Path. Vég. France* 8: 81-83. 1921.—Mimosa exposed to sunlight suffer more severely from a temperature of -11°C . than when shaded and cooled.—Jean Dufrenoy.

626. KAZNELSON, PAUL. *Die Grundlagen der Proteinkörpertherapie.* [The foundation of protein therapy.] *Ergebn. Hygiene Bakt. Immunitätsf. u. Exp. Therap.* 4: 249-282. 1920.—Besides presenting the general principles of protein therapy the author gives an extensive bibliography.—W. H. Chambers.

627. [MILLIGAN, S., ET AL.] *Proceedings of the third meeting of mycological workers in India.* 45 p., 1 photo. *India Bd. Agric.: Calcutta*, 1921.—This is a detailed report of a conference held at the Agricultural Research Institute, Pusa, in February 1921, under the auspices of the Board of Agriculture, India. Included in the report are: An address by S. MILLIGAN, Agricultural Adviser to the Government of India; an address by F. J. F. SHAW, Officiating Imperial Mycologist; an address by R. S. HOLE, Forest Botanist, on The Physiology of Disease, followed by a discussion; a survey of the distribution, destructiveness, and methods of dealing with fungus diseases attacking the following crop plants: Wheat (*Triti-*

cum), oats (*Avena sativa*), jowar (*Andropogon sorghum*), barley (*Hordeum*), maize (*Zea mays*), rice (*Oryza sativa*), potato (*Solanum tuberosum*) chili (*Capsicum*), castor (*Ricinus communis*), tobacco (*Nicotiana*), poppy (*Papaver somniferum*), tomato (*Lycopersicum esculentum*), cardamom (*Elettaria cardamomum*), cotton (*Gossypium*), sugar cane (*Saccharum officinarum*), palms (*Areca catechu* and *Cocos nucifera*), and bamboo; a discussion on spraying; a discussion of provisions for education in mycology in India; discussions of legislation against fungus diseases, and of the Imperial Bureau of Mycology; and an address by FROILANO DE MELLO, of Portuguese India, on Medical Mycology.—*Winfield Dudgeon*.

628. NEUFELD, F., und LUISE KARLBAUM. Beiträge zu einigen Desinfektionsfragen. [Some problems of disinfection.] Zeitschr. Hygiene u. Infektionskrankh. 91: 29-53, 1921.—The time and concentration factors of different organic and inorganic disinfectants are tabulated as to their action on *B. coli* and the Staphylococci.—*W. H. Chambers*.

629. SAUNDERS, A. P. Proposed embargo on plant importation. Bull. Peony News 7: 47-49, 1919.—Objections to Quarantine No. 37 of the Federal Horticultural Board are cited.—*A. P. Saunders*.

630. SAVASTANO, L. Le suberosi ed il gruppo delle malattie costituzionali settoriali nei frutti degli agrumi. [Cork formation in citrus fruit and its relation to the group of constitutional disturbances of fruit sectors.] Ann. R. Staz. Sper. Agrumic. e Fruttic. Acireale 4: 105-112. Pl. 1-3. 1916/1918 [1919].—Traumatic cork formation on citrus fruits, due to accidental rubbing against branches or other woody parts or to percussion by hail, and cork formation, due in most cases to insect attacks, are to be distinguished from the 2 types of constitutional abnormal cork formation on the fruit which are here described. Degenerative cork formation, found mostly in late fruiting varieties and on old trees, is to be distinguished from sun-scald. Cork formation of an invading character leading to complete mummification and falling of the fruit requires about 2 months. This condition is attributed to the excessive use of artificial propagation methods and the naturally resulting tendency to propagation of the characters inherent to the fruit. Sectorial cork formation is subdivided into sectorial hypertrophy, sectorial albinism, and sectorial greening, which ". . . may well be derived from a pathologic variation in a proliferating cell, and the reproduction of the condition in the daughter cells. . . ." It is to be noted ". . . that no fungus or bacterial organism is to be seen in the first stages of cork formation although later injurious types may appear. . . ."—*A. Bonazzi*.

631. SCH. Nonnenbekämpfung durch giftige Gase. [Combating the nun-moth with poisonous gas.] Deutsch. Forstzeitg. 36: 393, 1921.—Attempts to kill nun-moths in a spruce forest by the use of chlorine-phosgene gas-bombs were unsuccessful. The male moths were overcome, but few were killed by the fumes, the females apparently were not affected.—*W. N. Sparhawk*.

632. STEFANI, T. DE. Alterazioni cecidiche più frequenti su alcuni alberi da frutta in Sicilia. [The more common cecid galls on fruit trees in Sicily.] Ann. R. Staz. Sper. Agrumic. e Fruttic. Acireale 4: 147-170. Pl. 6. 1916/1918 [1919].

633. STEFANI, T. DE. I zoocecidii del nocciuolo (*Corylus avellana*) in Sicilia. [Zoocecidia of filbert.] Ann. R. Staz. Sper. Agrumic. e Fruttic. Acireale 4: 171-186. Pl. 7. 1916/1918 [1919].

634. STIFT, A. Über im Jahre 1918 veröffentlichte bemerkenswerte Arbeiten und Mitteilungen auf dem Gebiete der tierischen und pflanzlichen Feinde der Zuckerrübe. [Noteworthy articles for 1918 dealing with animal and plant enemies of the sugar beet.] Centralbl. Bakt. II Abt. 52: 65-78, 1920.—In short critical discussions of articles appearing in 1917 and 1918 the writer summarizes 24 contributions dealing with animal pests of the sugar beet (pp. 65-73, and 15 articles dealing with plant diseases (pp. 73-78).—*Anthony Berg*.

PHARMACEUTICAL BOTANY AND PHARMACOGNOSY

HEBER W. YOUNGKEN, *Editor*E. N. GATHERCOAL, *Assistant Editor*

(See also in this issue Entries 32, 71, 111, 426, 427, 445, 458, 723, 727, 744, 747, 767, 775, 828)

635. ANONYMOUS. The inflammation caused by plants and its treatment. *Agric. Gaz. New South Wales* 32: 704. 1921.

636. ANONYMOUS. Yacca gum industry of South Australia. *Sci. Amer. Monthly* 3: 450. 1921. [From *Jour. Roy. Soc. Arts* Mar. 25, 1921].—The gum from *Xanthorrhoea hastilis* is discussed.—*Chas. H. Otis*.

637. ADAMS, R. W. Drug topics. Evaluation of wintergreen leaves. [Extracts from: ADAMS, R. W. Oil of wintergreen from Gaultheria. Thesis, University of Wisconsin, 1910.] *Jour. Amer. Pharm. Assoc.* 10: 366-368. 1921.—A series of oil-distillation experiments were performed on 4 lots of leaves of *Gaultheria procumbens*, an average oil yield of 1.24 per cent being obtained for 3 lots. The 4th lot yielded only 0.31 per cent. The average d_{25}^{25} was 1.1753. The leaves were covered with water and allowed to macerate 24 hours previous to distillation. The aqueous distillates were cohobated. Attention is called to the fact that appearance is no indication of quality in the leaves of *Gaultheria procumbens*, as attested by the purchase of a 150-pound bale of almost worthless North Carolina leaf from a "reliable" firm for a fair price.—*Anton Hogstad, Jr.*

638. ADLER, FRIED. Bestimmung des Aschengehalts einiger Arzneidrogen u. deren Grenzzahlen. [Determination of the ash content of several drugs and of their limits.] *Diss. Basel*, 1921.

639. BARNES, M. F. Black locust poisoning of chickens. *Jour. Amer. Vet. Med. Assoc.* 59: 370-372. 1921.—Of a flock of 200 chickens 50 died. It was found that they had been eating leaves of black locust (*Robinia pseudacacia*), and that chickens not having access to these leaves did not become sick. Experimental feeding confirmed the diagnosis, but another feeding experiment 3 months later gave negative results. It is suggested that locust poisoning of chickens may be confined to the period between July 1 and the middle of August.—*C. D. Marsh*.

640. BOHRISCH, P. Ueber Tupelostifte. [Dilating tents made of tupelo wood.] *Pharm. Zentralhalle* 62: 109. 1921.—The author takes exception to Braun's statement that surgical tents made of tupelo wood are worthless [see *Bot. Absts.* 8, Entry 1438]. When the soft wood of the root of *Nyssa aquatica* L. is compressed to $\frac{1}{4}$ – $\frac{1}{5}$ its volume, the mass retains its shape for a long time and when brought into contact with water swells as readily as tents made from *Laminaria*.—*H. Engelhardt*.

641. BROWN, R. C. Painted coffee. *Sci. Amer.* 123: 425. 1920.

642. BRUCE, E. A. Hydrangea poisoning. *Jour. Amer. Vet. Med. Assoc.* 58: 313-315. 1920.—The author describes 2 cases of poisoning by *Hydrangea hortensis* var. *otaska*, 1 case of a horse and 1 of a cow. Experiments with an extract produced illness in guinea-pigs.—*C. D. Marsh*.

643. CABLE, DONALD E. Phytochemical notes. A comparison of eastern and western hemlock oils. *Jour. Amer. Pharm. Assoc.* 10: 170-173. 1921.—The physical and chemical constants of 5 lots of eastern hemlock (*Tsuga canadensis*) oil, 3 of western hemlock (*Tsuga canadensis*) oil, 3 of western hemlock (*Tsuga heterophylla*) oil, and three samples of commercial hemlock oil were investigated. The results are tabulated.—*Anton Hogstad, Jr.*

644. CLARK, R. H., and K. B. GILLIE. Salicin content of British Columbian willows and poplars. *Amer. Jour. Pharm.* 93: 618-621. 1921.—Methods and results of analysis of bark from *Salix Nuttallii*, *S. Hookeriana*, *S. sitchensis*, *S. lasiandra*, *S. purpurea*, *Populus trichocarpa*, and *P. tremuloides* are given. The highest average yield from fall tests (3.90 per cent) was from *S. Nuttallii*, the highest from spring tests (7.38 per cent) was from *S. sitchensis*. The lowest average in fall test was .81 per cent, from *S. Hookeriana*; in spring, the lowest, 2.45 per cent, was from *P. tremuloides*.—*Anton Hogstad, Jr.*

645. CRAIG, J. F., and D. KEMOE. Investigations as to the poisonous nature of sorrel (*Rumex Acetosa*, Linn.) for cattle. *Jour. Dept. Agric. Ireland* 21: 314-317. 1921.—The plant was largely avoided in pasture, but when fed to 6 animals produced no apparent ill effects.—*Donald Folsom.*

646. ÉWE, GEO. E. The relative activity of different parts of the *Digitalis* plant. *Jour. Amer. Pharm. Assoc.* 10: 362-365. 1921.—The whole plant (*Digitalis purpurea*) and its different parts were dried, ground and made into tinctures by the U. S. P. process for tincture of *Digitalis*. Physiological assay of these tinctures showed that the roots and crowns, which are not now official in the U. S. P. IX, yielded tinctures conforming to the U. S. P. standard when freed from excessive soil. The roots and crowns amount to 5-10 per cent of the crop. Data are recorded on: The relative weights of the separate parts of freshly harvested plants and plants air-dried to a grindable state; the moisture content of recently harvested plants and their parts, and of plants and their parts air-dried to a grindable state; and the total and acid-insoluble ash of the whole plant and its parts.—*Anton Hogstad, Jr.*

647. EZENDAM, JOH. A. De kwantitatieve botanische analyse van Veevoedermiddelen. [The quantitative botanical analysis of cattle fodder.] 84 p., 6 pl. Wageningen, 1921.—The author gives a general outline of microscopical examinations of various plant products used as fodder for cattle.—*J. C. Th. Uphof.*

648. FECHNER, P. P. Die Anwendung von Farbstoffgemischen als Hilfsmittel in der Mikroskopie. [Use of coloring mixtures in microscopy.] *Zeitschr. Untersuch. Nahrungs- u. Genussmittel* 41: 170-172. 1921.—A coloring material called "Violet" is said to yield characteristic colors in contact with various cell-constituents, and thus to lend itself to qualitative determination of constituents of bread and mixed cereal products. The author has also prepared a substance called "Schwarz-Weiz-Rot," originally described by Herter, which is said to be similarly useful in quantitative microscopy of cereal products.—*E. E. Stanford.*

649. GATHERCOAL, E. N., and R. E. TERRY. The *Capsicum* monograph in U. S. P. IX. *Jour. Amer. Pharm. Assoc.* 10: 423-428. 1921.—The authors believe that the 5 points of the monograph on *Capsicum* which should be considered in the revision are, with chief points of discussion: (1) The common name. The synonym "Cayenne pepper" should be dropped from the U. S. P. (2) The botanical name in the definition. The specific name *minimum* or *fastigiatum* should be used instead of *Capsicum frutescens*. (3) The number of seeds in the fruit and possibly other points of physical appearance. A number of varieties were examined as to number of seeds, with 8-12 in Zanzibar (1910); 9-21 in Sierre Leone (1920); 13-49 in Japan (1920), and 9-47 in Bombay (1921); (4) Microscopical distinctions between the various capsicums in powdered form. The authors believe this can be done in connection with the outer epidermis of the pericarp. (5) Tests. (a) The present 2 per cent purity rubric has been borne out by the experience of the authors; (b) it is probably advisable to reduce the total ash limit to 6.5 per cent and the acid-insoluble ash to 1 per cent; (c) moisture limit of 7 per cent might well be established; (d) the 15 per cent non-volatile ether extract should not be lowered without further investigation; (e) the Scoville organoleptic test should possibly be adopted with modifications as set forth by the authors.—*Anton Hogstad, Jr.*

650. GRANT, E. H. The estimation of crude fiber in gum Karaya. *Jour. Amer. Pharm. Assoc.* 10: 270-272. 1921.—In estimating the amount of bark adhering to gum Karaya by the

usual method for crude fiber, the gum cakes together and sticks to the flask, so that it burns when boiling acid is poured upon it. The author describes a modification of the usual method which overcomes this difficulty.—*Anton Hogstad, Jr.*

651. GRIEBEL, C., and W. ROTHE. Beiträge zur mikroskopischen Untersuchung der Kaffee-Ersatzstoffe. [Microscopic study of coffee substitutes.] Zeitschr. Untersuch. Nahrungs- u. Genussmittel 41: 69-73. Fig. 1-2. 1921.—A coffee substitute which had caused emesis was found to consist of roasted narcissus bulbs (*Narcissus poeticus* L. or *N. pseudo-narcissus* L.). Elements of diagnostic value are the long bundles of calcium oxalate raphides which occur in elongated sheath-like cells, and which are especially numerous in the scale-like leaf bases. The fundamental tissue is of regular, thin-walled, almost isodiametric parenchyma, which in the roasted bulb contains small swollen starch-grains demonstrable by clearing and treating with iodine. Presence of the alkaloid narcissin could not be demonstrated. No characteristic reaction has been given for an emetic bitter principle ascribed to *Narcissus* by previous workers. The leaf structure of a marine grass (*Zostera marina* L.), a worthless adulterant of coffee and substitute for tobacco, is described.—*E. E. Stanford.*

652. GRIMME, CLEMENS. Neuere und Neueste ueber Capsella Bursa-pastoris. [Latest data on *Capsella Bursa-pastoris*.] Pharm. Zentralhalle 62: 217. 1921.—During the world war it was found that shepherd's purse could be used as a substitute for ergot, golden seal, or other vegetable drugs with haemostyptic action. A detailed account of the chemistry and therapy of this drug is given.—*H. Engelhardt.*

653. HENRY, MAX, and F. WHITEHOUSE. Feeding experiments with *Solanum opacum*. Agric. Gaz. New South Wales 32: 741-742. 1921.—Three species of *Solanum* are mentioned as found in Australia, *S. opacum*, *S. pterocaulon*, and *S. astroites*. Former evidence seemed to indicate that some species of *Solanum* are harmful. *S. opacum* was fed at various times to sheep and pigs without ill effects.—*L. R. Waldron.*

654. HERMANN, E. Chemie der Wulstlinge. [Chemistry of the genus *Amanita*.] Pharm. Zentralhalle 62: 590. 1921.—The fungi contain 87-90 per cent moisture. Propionic, palmitic, and fumaric acids and trimethylamine, choline, muscarine, and muscaridine are present. *Amanita muscaria* contains a yellowish brown fat of butter-like consistency which contains phosphorus and congeals at 8-9°C. This is present also in *A. phalloides* and *A. pantherina*. *A. muscaria* contains glucose, mannose, mycose, a fungus-cellulose called fungin, and at least 4 kinds of ferments, some of which split fats, others acting as oxidizing agents. A toxin producing incoordination is also present in *A. muscaria*. *A. phalloides* contains, beside muscarine, 2 toxins, 1 acting like phosphorus, the other, called phallin, being more toxic than helvellic acid; both produce enlargement of the liver. The muscarine in the Siberian *Amanitas* acts differently from the muscarine in the European fungi, producing only incoordination. The coloring principles are very unstable, being rapidly oxidized. *Amanita* also contains a camphor-like substance, amanitol, and a volatile oil. The toxicity of the *Amanitas* appears less than is generally supposed, especially when young fungi are used and the water in which they are boiled is discarded.—*H. Engelhardt.*

655. HILTNER, R. S., and L. FELDSTEIN. Composition of hollyhock seed and oil. Jour. Indust. and Eng. Chem. 13: 635. 1921.—The empirical composition of the mature seeds and physical properties of the oil are given.—*Henry Schmitz.*

656. HOLICK, ARTHUR. Loco weeds. Nat. Hist. 21: 85-91. 7 fig. 1921.—Certain leguminous plants of western U. S. A. which produce "loco" in grazing animals are described and illustrated. The symptoms of different types of locoed animals are described, and the work done in determining the nature of the constituent producing "loco" is summarized.—*Albert R. Sweeney.*

657. HOLM, THEO. **Diagnostical elements in drug anatomy and their nomenclature.** Jour. Amer. Pharm. Assoc. 10: 450-453. 1921.—Suggestions relative to the diagnosis of several drugs, namely, Podophyllum, Cimicifuga, Hydrastis, Aristolochia Serpentaria, Stillingia, Gelsemium, Sassafras, are offered the collaborators on the revision of the United States Pharmacopoeia.—Anton Hogstad, Jr.

658. KRAFFT, K. **Larven in Brot.—Kornraden in Mehl.** [Larvae in bread; corn-cockle in flour.] Zeitschr. Untersuch. Nahrungs- u. Genussmittel 41: 75-78. 1921.—Larvae of *Endrosis lactella* Schiff are reported as infesting brown bread, doubtless gaining access to freshly-baked bread from infested refuse flour. Several cases of serious illness have followed the use of flour sold as American wheat and rye which was adulterated with ground clover, beans, and other leguminous seeds, chestnut and potato flour, etc. In various samples large amounts of clover and ground Rangoon beans have been found. Samples of material which has caused illness contained over 0.5 per cent corn-cockle (*Agrostemma githago*). Bread baked from this flour killed white mice in 2 days. A method of clearing powders from starch for microscopic investigation is described.—E. E. Stanford.

659. LAWALL, CHARLES H. **Visiting old friends.** Amer. Jour. Pharm. 93: 591-599. Pl. 8. 1921.—This is a brief account of a September botanizing trip in the neighborhood of Great Egg Harbor, New Jersey.—Anton Hogstad, Jr.

660. MCGILL, WILLIAM J. **Note on Digitalis saponins.** Jour. Amer. Pharm. Assoc. 10: 266-267. 1921.—The author's results appear to support the view originally put forth by Ko-bert that any haemolytic activity of the leaf drug of *Digitalis* is due to saponins resulting from hydrolysis of the saponins. The author suggests that the saponins of improperly dried or stored drugs may undergo such decomposition that preparations from them exhibit haemolytic action. The experiments were made on drugs obtained from *Digitalis purpurea* and *D. sibirica*.—Anton Hogstad, Jr.

661. MAIDEN, J. H. **Plants which produce inflammation or irritation of the skin.** Agric. Gaz. New South Wales 32: 657. 1921.—Evidence is brought forward to indicate that foliage of parsnips (*Pastinaca sativa*) is toxic to certain individuals, producing acute dermatitis.—L. R. Waldron.

662. MAIDEN, J. H. **Plants which produce inflammation or irritation of the skin.** Agric. Gaz. New South Wales 32: 704. 1921.—Evidence indicates that "common ivy" may produce dermatitis in certain individuals.—L. R. Waldron.

663. MASSY. **Goudron marocain de Cedrus atlantica: préparation indigène; quelques caractères physiques et chimiques.** [Moroccan tar of *Cedrus atlantica*: domestic preparation, some physical and chemical properties.] Jour. Pharm. et Chim. 24: 294. 1921.—The method of obtaining the tar used by the natives is described, and physical and chemical properties of 4 samples of tar are given.—H. Engelhardt.

664. NEWCOMB, E. L. **Aspidium standards.** Jour. Amer. Pharm. Assoc. 10: 524-525. 1921.—The author presents data as to the total and acid-insoluble ash content of (1) crude material of *Aspidium* purchased several years ago and (2) fresh material. The ash yields of the old samples indicate that the present standard is satisfactory. The high total and acid-insoluble ash of the samples of *Osmunda* sold as *Aspidium* indicates the desirability of an acid-insoluble ash standard for this drug.—Anton Hogstad, Jr.

665. NEWCOMB, E. L. **Notes on ash yield of buchu.** Jour. Amer. Pharm. Assoc. 10: 549-550. 1921.—The results obtained from 13 samples of buchu as to total and acid-insoluble ash indicate: (1) The present purity rubric of 10 per cent is satisfactory; (2) the present ash standard of not to exceed 4 per cent seems too stringent. The author states that various

manufacturers agree with these findings. Total and acid-insoluble ash data are tabulated.—*Anton Hogstad, Jr.*

666. NEWCOMB, E. L., and C. E. SMYTHIE. Notes on agar-moisture and ash content. *Jour. Amer. Pharm. Assoc.* 10: 524. 1921.—Examination of 6 samples of agar showed that the moisture content ranged from 8.02 to 18.3 per cent; total ash from 3.84 to 4.58; and acid-insoluble ash (5 per cent HCl) from 0.43 to 1.20 per cent.—*Anton Hogstad, Jr.*

667. NEWCOMB, E. L., C. H. ROGERS, and C. V. NETZ. The ash yield of calumba. *Jour. Amer. Pharm. Assoc.* 10: 368-370. *Fig. 1.* 1921.—An apparatus for cleaning drugs for normal ash determinations consists of a motor to which a small hand brush is fastened at 1 end of the shaft. A tabulated comparison is given of the total and acid-insoluble ash contents of calumba, with and without cleaning.—*Anton Hogstad, Jr.*

668. NEWCOMB, E. L., C. E. SMYTHIE, and E. R. HODEL. Notes on the ash yield of *Cannabis*. *Jour. Amer. Pharm. Assoc.* 10: 695-697. 1921.—Data were prepared chiefly from American *Cannabis*, the data on the imported *Cannabis* being compiled from the literature. By removing or separating the seed, by rubbing the whole drug over a screen and subsequently winnowing, the authors state that it may be impossible to meet the present ash standard of 15 per cent. The present commercial samples of American *Cannabis* appear usually to come within this standard. From work on the acid-insoluble ash it seems advisable to establish a standard for the acid-insoluble ash, probably 4 or 4.5 per cent. The authors find that the present standard of not more than 10 per cent of fruit and other foreign matter should be retained and enforced.—*Anton Hogstad, Jr.*

669. PAMMEL, L. H. Alsike clover. *Vet. Med.* 16³: 48. 1921.—The symptoms of dermatitis produced by *Trifolium hybridum* are given.—*C. D. Marsh.*

670. PAMMEL, L. H. Castor bean poisoning. *Vet. Med.* 16³: 45. 1921.—The author quotes a review of a paper by Moreschi.—*C. D. Marsh.*

671. PAMMEL, L. H. China tree poisonous. *Vet. Med.* 16³: 47. 1921.—Two letters are quoted in which data are given in regard to poisoning of hogs and birds by *Melia azedarach*. The plant is described and its properties indicated.—*C. D. Marsh.*

672. PAMMEL, L. H. Coffee bean or sesban poisoning. *Vet. Med.* 16³: 48. 1921.—In addition to an abstract of a bulletin by Marsh and Clawson on *Daubentonia longifolia*, the author discusses possible poisoning by *Sesbania platycarpa*.—*C. D. Marsh.*

673. PAMMEL, L. H. Cowbane. *Vet. Med.* 16³: 48. 1921.—The characteristics and poisonous properties of *Cicuta maculata* are given.—*C. D. Marsh.*

674. PAMMEL, L. H. Is common sorrel (*Rumex Acetosa*) poisonous? *Vet. Med.* 16³: 47. 1921.—The author reviews the contradictory opinions of various authors in regard to possibilities of poisoning by species of *Rumex*.—*C. D. Marsh.*

675. PAMMEL, L. H. Potato tops cause poisoning. *Vet. Med.* 16³: 45. 1921.

676. PAMMEL, L. H. Russian thistle. *Vet. Med.* 16³: 45. 1921.—*Salsola tragus* in the hard stage may cause serious injury to the stomachs of animals.—*C. D. Marsh.*

677. PAMMEL, L. H. Sow thistle. *Vet. Med.* 16³: 48. 1921.—A reply to a correspondent, who supposed a cow to have been poisoned by *Sonchus oleraceus*, gives some characteristics of the plant and expresses the author's opinion that it did not cause the sickness of the animal.—*C. D. Marsh.*

678. PAMMEL, L. H. Wild parsnips nonpoisonous. *Vet. Med.* 16^o: 49. 1921.
679. PAMMEL, L. H. Young cockleburs and frozen alfalfa supposed to be poisonous. *Vet. Med.* 16^o: 48. 1921.—Young pigs are reported to have been poisoned by species of *Xanthium*, but it is not probable that frozen alfalfa is poisonous.—*C. D. Marsh.*
680. PIEKAERTS, J. A new oil plant from the Congo. *Sci. Amer. Monthly* 3: 418. 1921.—This liana, unnamed by the author, produces seeds whose kernels contain over 47 per cent of fatty matter, yielding an oil somewhat resembling that of the olive.—*H. W. Youngken.*
681. PINN, A. J. The distillation of mint oil. *Agric. Gaz. New South Wales* 32: 790. 1921.—Methods of procedure are given.—*L. R. Waldron.*
682. PRITZKER, J., and R. JUNGKUNZ. Beiträge zur Untersuchung und Beurteilung von Zichorie und anderen Kaffee-Ersatzstoffen. [Report on investigations and analyses of chicory (*Cichorium intybus*) and other coffee substitutes.] *Zeitschr. Untersuch. Nahrungs- u. Genussmittel* 41: 145-169. 1921.—An extended analytical process for the study of chicory and other coffee-substitutes is formulated and discussed. A new, more exact, and rapid indirect method of extract estimation is substituted for that of Trillich. The so-called "yield" is measured quantitatively by coloring-power. Analyses of 51 samples of bean-coffee, chicory, and other coffee substitutes are tabulated and discussed. The acidity of infusion, determined by the drop-method, differed considerably from published values. The extract content was used as a criterion for the diagnosis of chicory in coffee and coffee infusions. Sand-free ash of 38 samples of chicory was analyzed and the results compared with those of other authors. Alkali content of chicory ash was reckoned according to the method of Farnsteiner and the value confirmed by experiment.—*E. E. Stanford.*
683. RHODEHAMEL, W. H., and E. H. STEART. Atropine sulfate from *Datura stramonium*. *Jour. Indust. and Eng. Chem.* 13: 218-220. 1921.—Three methods for the extraction of atropine sulphate from *Datura stramonium* are presented.—*Henry Schmitz.*
684. RICHARD, A. Sur la teneur en aconitine de quelques échantillons d'alcoolature de feuilles d'aconit. [The amount of aconitine in samples of alcoholates of aconite leaves.] *Jour. Pharm. et Chim.* 23: 15. 1921.—It is advocated that alcoholates of aconite leaves be assayed. This preparation is widely used in France, and it was found that the aconitine content of products offered by reputable pharmaceutical houses varies from 0.0139 to 0.0409 per cent.—*H. Engelhardt.*
685. ROBAK, F. Yield and composition of wormwood oil from plants at various stages of growth during successive seasons. *Jour. Indust. and Eng. Chem.* 13: 536-538. 1921.—The yield of oil from the fresh herb during its flowering stage varies greatly from year to year, owing to varying climatic conditions. Drying the plants before distillation reduces the yield. The highest yield is obtained during the flowering period.—*Henry Schmitz.*
686. ROBERTS, O. D. The volatile oil from the leaves of *Ocimum gratissimum* L. *Jour. Soc. Chem. Indust.* 40: 144T. 1921.—The oil was found to contain 40-55 per cent of phenols, mostly thymol.—*G. B. Ray.*
687. ROGERS, C. H., and E. L. NEWCOMB. Notes on the ash yield of *Glycyrrhiza*. *Jour. Amer. Pharm. Assoc.* 10: 607-609. 1921.—Total and acid-insoluble ash data on 25 samples of *Glycyrrhiza* are given. The results are from samples of powdered commercial *Glycyrrhiza* and from samples which were cleaned, powdered, and ashed.—*Anton Hogstad, Jr.*
688. SABALITSCHKA, TH. Giftwirkung bei essbaren Pilzen. [Poisonous action of edible fungi.] *Pharm. Zentralhalle* 62: 235. 1921.—It was found that *Agaricus saponaceus* Fr.

(*Tricholoma saponaceum* Fr.) produces poisoning when consumed in large quantities, although most text books on mushrooms consider it as edible.—H. Engelhardt.

689. SCHOMER, ARNOLD. **Bestimmung des Yohimbins in der Yohimberinde.** [Estimation of Yohimbine in Yohimbe bark.] *Pharm. Zentralhalle* 62: 169. 1921.—Yohimbe bark contains 0.3-1.5 per cent of at least 4 alkaloids of which yohimbine ($C_{21}H_{33}N_3O_4$) appears most active. A method for estimating this base is given and its physical and chemical properties are described.—H. Engelhardt.

690. SEIGER, H. **Die Bombagen bei Dosen-Konserven.** ["Swells" in canning.] *Zeitschr. Untersuch. Nahrungs- u. Genussmittel* 41: 50-68. 1921.—Results of analyses of gasses found in "swells" of canned vegetables and meats are given. Causes of "swells," such as action of bacteria due to improper heating or uncleanness, presence of spores, etc.; gas from chemical action and from physical action due to expansion of gas-saturated materials by heat, are discussed in some detail. Experiments in feeding 27 samples of various "swelled" canned goods to mice, rats, or rabbits resulted in death in 2 cases (mice fed with canned sausage) and illness in 1 (rats fed with beans). The writer believes that danger of poisoning from swelled canned goods has been overestimated.—E. E. Stanford.

691. SHERK, D. C. L. **Phytochemical notes. The Monarda oils of 1918 and 1919.** *Jour. Amer. Pharm. Assoc.* 10: 97-101. 1921.—This report on a study of several *Monarda* oils (from *Monarda punctata* and *M. fistulosa*), collected in different localities, includes data as to percentage yield, physical constants, cohobation, and the heptane test.—Anton Hogstad, Jr.

692. SIEVERS, A. F. **The influence of inhibiting flowering on the formation of alkaloids in the Daturas.** *Jour. Amer. Pharm. Assoc.* 10: 674-676. 1921.—By removing the flower buds of various species of *Datura*, the author found that not only do the plant and leaves increase in size, but the alkaloidal content is exceptionally high, an average total alkaloids being increased from 0.426 to 1.334 per cent. The results with *Datura leichardtii*, *D. gigantea*, *D. quercifolia*, *D. Stramonium*, *D. Stramonium inermis*, *D. Tatula*, *D. Tatula inermis*, and *D. inermis* are tabulated.—Anton Hogstad, Jr.

693. SMYTHE, C. E. and F. L. NEWCOMB. **Notes on the ash yield of gentian.** *Jour. Amer. Pharm. Assoc.* 10: 457-458. 1921.—Examination of 15 samples of gentian as to total and acid-insoluble ash content show that the normal ash, i.e., the ash of the thoroughly cleaned drug, is 2-2.5 per cent. Commercial samples usually contain between $\frac{1}{2}$ and 3 per cent of foreign inorganic matter insoluble in 5 per cent hydrochloric acid. The acid-insoluble ash of the cleaned drug is less than 1 per cent.—Anton Hogstad, Jr.

694. SYMONS, S. T. D. **The effects of feeding Sudan grass to stock. Some experiments and conclusions.** *Agric. Gaz. New South Wales* 32: 791-795. 1921.—Horses feeding on Sudan grass were taken sick, some dying. Trials in feeding horses Sudan grass, exclusively in certain cases, were carried on at various places without bad results other than a few light cases of colic. If Sudan grass is injurious to horses it is so only under exceptional conditions.—L. R. Waldron.

695. UGARTE, TRIFON. **Nouvelle méthode de dosage de la cafeine dans le maté, le café, le thé, la noix de Kola et le guarana.** [New method of estimating the caffeine in maté, coffee, tea, kola nut and guarana.] *Jour. Pharm. et Chim.* 24: 387. 1921.—A new method for estimating caffeine in small quantities of these drugs is described.—H. Engelhardt.

696. VIEHOEYER, ARNO, and J. F. CLEVINGER. **False saffron.** *Jour. Amer. Pharm. Assoc.* 10: 671-674. *Pl. 1, fig. 1.* 1921.—The material for a skillful substitute for saffron, imported from Spain, resembled *Crocus* in appearance and odor, but was found to consist of the tubular florets of a species of *Onopordon*, agreeing most closely with *O. sibthorpianum* Boiss

and Heldr. This material was found to be artificially dyed with a mixture of Tartrazine and commercial Ponceau 3 R. and weighted with a salt mixture of at least 5 per cent of potassium nitrate and borax. Methods of examination and identification are included in the paper.—*Anton Hogstad, Jr.*

697. VIEHOEVER, ARNO, and J. F. CLEVINGER. The substitution of *Convallaria* flowers for Chamomile. Jour. Amer. Pharm. Assoc. 10: 937-938. Pl. 1. 1921.—The authors report another case of substitution for Chamomile (*Matricaria Chamomilla*), which they believe occurred by mistake. The sample, labelled Chamomile, contained loose flowers which, superficially resembling Chamomile, proved to be *Convallaria*. *Convallaria* pollen grains are oval and smooth and have 2 openings in the exine, while in Chamomile they are spherical, spiny, and have 3 openings in the exine.—*Anton Hogstad, Jr.*

698. VIEHOEVER, ARNO, and CLARE OLIN EWING. Alkaloids in rhizomes and roots of *Ipecac*. Jour. Amer. Pharm. Assoc. 10: 763-766. Pl. 1. 1921.—By a study of the habit of growth and by chemical analyses of *Ipecac* plants, the authors find that rhizomes should not be eliminated from the drug, but that they should be admitted as part of the official U. S. P. drug, provided the alkaloidal content is not lowered thereby. The percentage of ether-soluble alkaloids in the rhizomes is shown in several alkaloidal-content tables. By mixing varying amounts of stems and root portions, increasing the stem portions to 25 per cent, the alkaloidal content in no case was lower than that of the required standard of 1.75 per cent.—*Anton Hogstad, Jr.*

699. VIEHOEVER, ARNO, GEORGE L. KEENAN, and JOSEPH F. CLEVINGER. Domestic and imported *Veratrum* (Hellebore). *Veratrum viride* Ait., *Veratrum californicum* Durand and *Veratrum album* L. Jour. Amer. Pharm. Assoc. 10: 581-593. Pl. 3, fig. 2. 1921.—The author gives a method for differentiating roots and rhizomes of the domestic (*Veratrum viride*) and the imported *Veratrum* (*V. album*), which has hitherto been considered impossible, and notes on differentiating *V. californicum*. The main differentiating characteristics are the endodermal cells, which show different thickenings of the inner tangential and radial walls. The raphides of calcium oxalate and the epidermal cells also proved more or less characteristic. No distinctive results were obtained in microchemical tests for differentiation with hydrochloric acid. Concentrated sulphuric acid may be used, but is not entirely satisfactory. Rundquist's statement that the alkaloids are located mainly in the parenchyma and collenchyma below the epidermis was confirmed; Borscow's could not be verified. A detailed botanical study of each of the 3 *Veratrum*s and a bibliography are included.—*Anton Hogstad, Jr.*

700. WALLIS, T. E. The development of quantitative microscopy. Jour. Amer. Pharm. Assoc. 10: 249-252. 1921.—The author describes a Lycopodium method for quantitative microscopy which can be applied under ordinary conditions with an ordinary microscopical outfit. Known weights of Lycopodium and the material to be examined are mixed, suspended in a suitable agent such as mucilage of tragacanth, olive oil, etc., thoroughly shaken, and a drop transferred to a slide. Counts are made in a number of fields of both Lycopodium spores and characteristic elements of the powder to be analyzed. Since 94,000 spores weigh 1 mgm., the number of characteristic particles present per mgm. of Lycopodium can be calculated. To determine the purity of a substance, a mixture containing known proportions of the latter and the impurities that have been found is mixed in known proportions with Lycopodium and made into a suspension. Counts of the latter disclose the number of characteristic particles per mgm. of the pure substance when counted in admixture with the impurities present. With this as the standard, the amount of pure substance in the original article is calculated. A bibliography is appended.—*Anton Hogstad, Jr.*

701. WEIDMANN, FR. Bestimmung der Kleibestandteile im Mehl. [Determination of bran constituents in flour.] Zeitschr. Untersuch. Nahrungs- u. Genussmittel 41: 236-237.

1921.—A microscopic method is described in which the grain tissues and earth are freed from starch and cleared by treatment with alkali and bromine-water and centrifuging. Quantitative results are obtained by comparison with material of known character.—*E. E. Stanford.*

702. WIELEN, P. VAN DEN. *De Inzameling von Genesskruiden in Loosdrecht.* [Collecting medicinal plants in Loosdrecht.] *Pharm. Weekbl.* 58: 175-178. *Pl. 3*, *fig. 5.* 1921.—Around Loosdrecht 30 kinds of medicinal plants are collected. From 3,000 to 10,000 kgm. of *Calamus* root are gathered every year. Collection, peeling, and preserving of the root are illustrated.—*H. Engelhardt.*

703. WINDISCH, RICHARD. *Mit Ocker verfälschter gemahlter Zimt nebst einem Beitrage zum Aschen- und Sand-Gehalt des Insektenpulvers.* [Ground cinnamon adulterated with ochre; ash and sand content of insect powder.] *Zeitschr. Untersuch. Nahrungs- u. Genussmittel* 41: 78-81. 1921.—Samples of ground cinnamon collected in Keszthely, Hungary, were adulterated with red ochre. The ash was characterized by red color and strong iron reaction. Ash analyses of fine samples of insect powder are reported. Total ash ranged from 6.84 to 9.78 per cent. From 0.27 to 0.88 per cent is reported as sand (on the basis of insoluble ash determinations).—*E. E. Stanford.*

704. WONG, YING C. *The constituents of the roots of American ginseng.* *Jour. Amer. Pharm. Assoc.* 10: 431-437. *Fig. 1.* 1921.—A histological, chemical and pharmacological examination of the roots of *Panax quinquefolium* is described. Chemical examination shows the following: (1) presence of an enzyme in relatively small amount; (2) absence of alkaloid; (3) presence of a small amount of a pale yellowish oil and dark brown resinous substance which reacts to the phytosterol reaction; (4) presence of an appreciable amount of sugar and a saponin, the latter when purified a light yellowish white amorphous powder, melting at 170-172°, possessing no toxic action to fish or other animals, and having no haemolytic action.—The writer failed to find clusters of calcium oxalate crystals as reported by Davydow. The cross-section is described and illustrated.—*Anton Hogstad, Jr.*

705. YOUNGKEN, HEBER W. *Muir-Puama.* *Amer. Jour. Pharm.* 93: 625-627. 1921.—The author describes the plant, root, histological characteristics of root, and the powder, and adds a few notes in regard to preparations other than the fluidextract. A bibliography is included. [See also following entry.]—*Anton Hogstad, Jr.*

706. YOUNGKEN, HEBER W. *Observations on Muir-Puama.* *Jour. Amer. Pharm. Assoc.* 10: 690-692. 1921.—This is a pharmacognostical study of the root of *Liriodendron ovata* Miers, known as Muir-Puama, which has been used in France and Brazil in treating nervous disorders. [See also preceding entry.]—*Anton Hogstad, Jr.*

707. ZUFALL, C. J. *Alexandria Senna cultivated in India.* *Jour. Amer. Pharm. Assoc.* 10: 185-186. 1921.—An apparently unknown form of Alexandria Senna, recently imported, consists of unusually large leaves, 2.5-4 cm. long. The plant had been grown on a plantation in India. The leaves are superior to those from Sudan in size and purity, are equal if not superior in taste and odor, and are unbroken and practically free from stems and dirt, as they are handpicked.—*Anton Hogstad, Jr.*

PHYSIOLOGY

B. M. DUGGAR, *Editor*W. J. ROBBINS, *Assistant Editor*

(See also in this issue Entries 42, 227, 255, 295, 363, 381, 382, 385, 431, 436, 451, 454, 542, 550, 551, 555, 558, 555, 624, 627, 628, 654, 692, 871)

GENERAL

708. MEYER, ARTHUR. Die Plasmabewegung verursacht durch eine geordnete Wärmebewegung von Molekülen. [The protoplasmic movements caused by an ordered heat vibration of the molecules.] Ber. Deutsch. Bot. Ges. 38: 36-43. Fig. 1. 1920.—The results of previous work by the author in relation to morphological and physiological analyses of cells of plants and animals, combined with some early results obtained by Nägeli, have led to the following formula for measuring the velocity of streaming protoplasm:

$$v = 129 \times 10^5 \times \frac{S}{M} \times r \times \frac{T}{K}$$

where S is the density of the protoplasm; r , the radius of the spherical particles in the protoplasm; t , the temperature measured from absolute zero; K , the coefficient for the inner friction of the protoplasm; M , the molecular weight of the substance; and V , the centimeters of movement per second.—*P. S. Wolpert.*

PROTOPLASM, MOTILITY

709. LAUTERBACH, LUISE. Untersuchungen über die Beeinflussung der Protoplasmaströmung der Characeen durch mechanische und osmotische Eingriffe. [The effect of mechanical and osmotic interference with protoplasmic movement in the Characeae.] Beih. Bot. Centralbl. 38: 1-52. Fig. 1-2. 1921.—All pressures or blows of sufficient intensity to deform or compress the cell cause cessation of movement of the protoplasm. With young cells and high temperatures less pressure is needed to stop the movement than for older cells and lower temperatures. Osmosis produced like effects. NaCl, KCl, KNO₃, and CaCl₂ solutions, alcohol, and sugar solutions cause the movement to stop for a time. With ether, alone and with pressure, a 2 per cent solution deadens the cell to mechanical interferences and weakens the osmotic effects. A stronger solution causes loss of ability to move, and if continued results in death.—*L. Pace.*

DIFFUSION, PERMEABILITY,—PHYSICAL-CHEMICAL PHENOMENA

710. BLACKMAN, V. H. Osmotic pressure, root pressure, and exudation. New Phytol. 20: 106-115. Fig. 1-3. 1921.—Lepeschkin's view that the exudation of fluid by *Pilobolus* and *Phascoglossa* is due to the osmotic pressure of the secreting cell together with the differential permeability of the 2 sides of the cell cannot be considered acceptable, and therefore some other basis must be found for the satisfactory explanation of the passage of water from living cells into dead wood elements. In this connection the value is pointed out of Pfeffer's scheme in explaining exudation and root pressure, according to which the osmotic substance is supposed to exist in the cell at 2 different concentrations on 2 sides of the cell. Again it is possible that the special properties of the membrane may bring about a "negative osmosis," in which a fluid will pass from a strong solution into a weak one, perhaps by the action of electric forces. Such a negative osmosis has been demonstrated for goldbeaters' skin.—*I. F. Lewis.*

711. CAREY, CORNELIA LEE. On the gross structure of an agar gel. Bull. Torrey Bot. Club 48: 173-182. Fig. 1-4. 1921.—Examination of agar strips swollen by water showed a lamellated structure; when agar gel was placed on silk and dried, the structure was formed at about 92 per cent water content and was complete at a much lower per cent. Formation of such structure depends on rapidity of drying, which varies with the temperature used; those gels dried at room temperature showed no such structure. The phenomenon is shown not to be due to strain of stretching on silk. The structure varied somewhat with the percentage of agar.—*P. A. Munz.*

712. OVERTON, JAMES BERTRAM. The mechanism of root pressure and its relation to sap flow. *Amer. Jour. Bot.* 8: 369-374. 1921.—The author discusses the factors which control the movement of water from the soil through the root into the vessels, and especially the relation of "root pressure" to this movement. Root pressure probably does not assist the ascent of sap through the stem, since this ascent may occur in the presence of a negative gas pressure in the vessels. Root pressure may be important, however, in causing a periodic flooding of the vessels with water, or in maintaining the form and turgidity of roots. The difficult point to explain is that root cells are able to take in water and solutes and to pass them on to the xylem, a process which involves an unilateral excretion from a turgescient cell. This unilateral excretion may be due to differences in semipermeability or in osmotic concentration on different sides of the same cell. There is probably an osmotic gradient from the root periphery to the cells bordering on the vessels. This gradient may cause the passage of water inward through the root cortex and produce a high hydrostatic pressure in the cells surrounding the vessels, as a result of which water and solutes may be excreted into the vessels. Other suggestions are also discussed and the difficulties of the whole problem emphasized.—E. W. Sinnott.

713. PRIESTLY, J. H. Plant physiology. *Sci. Prog.* [London] 16: 201-207. 1921.—A short review is presented of a recent series of papers by Jacques Loeb dealing with the relation of proteins to electrolytes.—J. L. Weiner.

714. RABER, ORAN L. A quantitative study of the effect of anions on the permeability of plant cells. II. *Amer. Jour. Bot.* 8: 366-368. 1 fig. 1921.—The author continues his previous work [see following abstract] on the effect of anions on the permeability of cells of *Laminaria*. A number of organic and inorganic salts were employed. The results support his previously reported conclusion that the effects upon permeability depend upon the valency of the anion, regardless of whether the salts are organic or inorganic.—E. W. Sinnott.

715. RABER, ORAN L. The effect upon permeability of polyvalent cations in combination with polyvalent anions. *Amer. Jour. Bot.* 8: 382-385. 1 fig. 1921.—The significance of the results obtained appears in the following summary: "Bivalent and trivalent cations in combination with monovalent anions produce an increase in the electrical resistance of *Laminaria*, but when combined with bivalent or trivalent anions the increase is less and may be entirely lacking."—E. W. Sinnott.

716. SMALL, JAMES. The hydron differentiation theory of geotropism: a reply to some criticisms. *New Phytol.* 20: 73-81. 1921.—This is a reply to criticisms of Blackman [*New Phytol.* 20: 38-42. 1921.] The particles involved in the original statement of the author's hypothesis [see *Bot. Absts.* 7, Entry 1366] are not, as Blackman assumes, ultra-microscopic, but of such a size that "settling" or "creaming" would take place as demanded by the hypothesis. The criticisms as to the time required for the hypothetical "creaming" are met by citation of data from Perrin (*Brownian Movement and Molecular Reality*. London, 1910), who states that when a uniform emulsion is placed in a cell 100 μ high "a few minutes suffice for the lower layers to become manifestly richer in granules than the upper layers." Stokes' law governing all slow movements of spheres through a relatively viscous medium under a constant unidirectional force is shown from the same author to apply to particles even smaller than those involved in the author's hypothesis. Other points of the criticisms are also answered.—I. F. Lewis.

717. STILES, WALTER. Permeability. *New Phytol.* 20: 45-55. 1921.—This contains the first 2 chapters of a general summary of knowledge of permeability. After an introductory statement a discussion is given of the physical and chemical organization of protoplasm, and of its differentiation within the cell.—I. F. Lewis.

718. STILES, WALTER. Permeability. *New Phytol.* 20: 93-106. Fig. 1-2. 1921.—This third chapter is devoted to surface phenomena. The biophysics of surface tension, ad-

sorption, electric potential of surfaces, and of their mutual interaction are discussed as bearing on the general problem of permeability. [See also Bot. Absts. 11, Entry 717.]—*I. F. Lewis*.

WATER RELATIONS

719. ARTHUR, J. M. Exudation of water by leaves. [Rev. of: FLOOD, MARGARET G. Exudation of water by *Colocasia antiquorum*. Notes Bot. School Trinity Coll. Dublin 3: 59-65 (see Bot. Absts. 4, Entry 1406); Sci. Proc. Roy. Dublin Soc. 15: 505-512. 2 pl. 1919 (see Bot. Absts. 5, Entry 855).] Bot. Gaz. 69: 358. 1920.

720. BACHRACH, E. [Rev. of: ALEXANDROFF, V. C., O. G. ALEXANDROVA, et A. S. FIMO-FEJEFF. L'arrivée de l'eau dans la feuille et son influence sur la structure. (The arrival of water in the leaf and its influence on structure.) Trav. Lab. Physiol. Jard. Bot. Tiflis. Rev. Gén. Bot. 33: 479-480. 1921.

721. BENEDICT, R. C. Nephrolepis nutrition. Amer. Fern. Jour. 11: 41-43. 1921.—The article compares 2 ferns of the same age and variety growing in pots of the same size. One is 4-5 times as large as the other on account of its stolons projecting into a tank of water, where roots formed, thus increasing the food supply.—*F. C. Anderson*.

722. RICHIE, H. Sur l'orientation des tiges. [On the orientation of stems.] Compt. Rend. Acad. Sci. Paris 173: 424-426. 1921.—This is a continuation of the study of the relation of tension and water content in the zones of elongation of stems to their orientation. Experimental and observational data indicate that the orientation of stems in beans, cedars, *Phytolacca decandra*, and *Cucurbita maxima* is closely associated with the water content. The lack of turgescence in the tips of branches induces the oblique position with reference to the longitudinal axis of the stem, while turgescence in the tip of other branches equalizes the force of tension in such a way as to maintain a parallel position throughout the entire length.—*W. K. Farr*.

MINERAL NUTRIENTS

723. BERTRAND, GABRIEL, et MME. M. ROSENBLATT. Sur la présence générale du manganèse dans le règne végétal. [On the distribution of manganese in the vegetable kingdom.] Compt. Rend. Acad. Sci. Paris 173: 333-336. 1921.—Manganese was found in all of the 19 varieties of cultivated plants which were tested. The largest amounts were found in the stem of shepherd's purse and in the seeds of mustard. The smallest amounts were characteristic of the citrus fruits. The range was from 0.03-3.8 mg. per 100 mg. of fresh material, or 0.15-5 gm. per 100 gm. of dry material, or 3.8-146.9 mg. per 100 gm. of ash.—*C. H. Farr*.

724. JONES, J. S., and D. E. BULLIS. Manganese in commonly grown legumes. Jour. Indust. and Eng. Chem. 13: 524-525. 1921.—Evidence is presented which indicates that alsike [*Trifolium hybridum*] and other clovers utilize manganese in larger amounts than any other legumes commonly grown in Oregon and that alfalfa makes least use of it.—*Henry Schmitz*.

725. JONES, LINUS H., and JOHN W. SHIVE. Effect of ammonium sulphate upon plants in nutrient solutions supplied with ferric phosphate and ferrous sulphate as sources of iron. Jour. Agric. Res. 21: 701-728. Pl. 136, 9 fig. 1921.—Two series of cultures were used, one consisting of 20 solutions uniformly selected from Tottingham's series of 84 solutions, and the other of the same solutions with a substitution of NH_4NO_3 in equal osmotic concentration for KNO_3 . The cultures were renewed every 3-4 days through a growing period of 35 days. Iron was supplied in equivalent amounts in all cases. Dry weights were taken of tops and roots. In series I the initial value of PH 4.6-4.9 was changed to PH 5.3-5.7. In series II this change was from PH 4.6-4.9 to 4.4-5.1. In the 1st series the ferric phosphate was not sufficiently available to prevent chlorosis, while ferrous sulphate did prevent it. In the 2nd series, more than 0.01 mg. of ferrous phosphate per l. produced a toxic action, while ferric phosphate was more available than in series I. In both cases high top yield was associated with a wide

range in the proportions of the salts. In series II high top yield was associated with high root yield, while this was not the case in series I. The salt proportions of the solution together with the P_H value appear to determine the availability and efficiency of any iron salt for plant use.—*F. S. Wolpert.*

726. MAQUENNE, L., et R. CERIGHELLI. Sur la distribution du fer dans les végétaux. [On the distribution of iron in plants.] *Compt. Rend. Acad. Sci. Paris* 173: 273-278. 1921.—Maquenne and Demoussy had previously shown that copper is a migratory element in plants, going to regions of greatest vitality, and therefore concluded that it played a role in the active metabolism of plants. Iron in plants is found either as an insoluble peroxide deposited by evaporation or fixed, as by mordanting, to the cell membrane or in organic complexes comparable to the hematogene of Bunge. The organic active iron is found especially in parts not subjected to evaporation and the inactive iron in the epidermis and similar tissues. The iron content of 30 kinds of plants is given, several different parts of each plant being analyzed separately. The amount varies from 3 mg. of metallic iron per kgm. of dry peanut cotyledon to 362 mg. in leaves of spinach and *Crataegus pyracantha*. Distribution of iron follows closely that of copper. Iron is precipitated almost completely by boiling. Iron is present in relatively small amounts in plants, which indicates its toxicity in higher concentrations. It is concluded that iron is essential to the metabolism of plants, leaves usually containing more than do other parts.—*C. H. Farr.*

727. TILLMANS, J., und ANNA BOHRMANN. Alkalitäts- und Phosphatbestimmung in der Asche von Lebensmitteln. [Alkali and phosphate determinations in the ash of foodstuffs.] *Zeitschr. Untersuch. Nahrungs- u. Genussmittel* 41: 1-17. 1921.—A method suitable for alkali determinations of all ashes, in the cold, is described. In all ashes of characteristic alkalinity (due to oxides and carbonates), alkali determinations may be carried out by the usual methods if a sufficient amount of calcium chloride is added before the back-titration with alkali; in this way the disturbing influences of phosphates may be avoided. A new titrametric method of estimation of ortho-, pyro-, and metaphosphates in ash, whose value has been confirmed on artificial mixtures, is described. Ash of milk is of characteristically low alkalinity and contains from 30 per cent to 40 per cent of orthophosphates; pyro- and metaphosphates are not present. Flour ash is not characteristically alkaline, but contains mixtures of ortho- and pyro- or pyro- and metaphosphates. Metaphosphates were found in wheat flour, in gluten, and in potato starch. Ash of beef and horseflesh contained mixtures of ortho- and pyrophosphates, but no carbonate or oxide. Alkalinity of ash of fruit juices is due almost wholly to carbonates. From 15 to 20 per cent of orthophosphates are present, but neither pyro- nor metaphosphates. Alkalinity of ash of cacao is due chiefly to carbonates; 33 per cent of orthophosphate is present.—*E. E. Stanford.*

PHOTOSYNTHESIS

728. WILMOTT, A. J. Experimental researches on vegetable assimilation and respiration. XIV. Assimilation by submerged plants in dilute solutions of bicarbonates and acids: an improved bubble-counting technique. *Proc. Roy. Soc. London* B 92: 304-327. 1921.—Errors in bubble counting from submerged plants may be minimized by the use of a bent glass nozzle on the cut end, discharging bubbles of uniform size via an inner cup filled with distilled water. Disturbances due to initial diffusion effects of carbon dioxide and oxygen are discussed. The former appear when carbon dioxide is a limiting factor, the latter can be eliminated by using oxygen-saturated water. Dilute HCl is without effect on the rate of bubble production in plants grown in soft water, likewise in plants from calcareous water where CO_2 is not a limiting factor. Records of acceleration of rate by acid are considered due to increased liberation of CO_2 from invisible incrustations. A study of rates in CO_2 and sodium bicarbonate solutions shows close agreement with physico-chemical data on rate of dissociation of bicarbonate solution and lends no support whatever to Anglescin's view that water plants are capable of decomposing bicarbonates.—*Paul B. Sears.*

METABOLISM (GENERAL)

729. APPLEMAN, CHARLES O. Reliability of the nail test for predicting the chemical composition of green sweetcorn. Jour. Agric. Res. 21: 817-820. 1921.—The exudate pressed with the thumbnail from grains of green maize of different maturity was classified as follows: premilk, milk, early dough, dough. Moisture and carbohydrate determinations were then made to check the nail test. The reliability of the test is influenced by the rate of ripening and by the rate of water loss by evaporation. The corresponding stages of crops ripening under different climatic conditions vary both in uniformity of composition and average percentage composition. The latter is much more uniform in a crop matured at an average hourly mean temperature of 65°F. than in one matured at 83°F. The nail test is more reliable when applied to crops which mature slowly in the cool autumn.—As ripening proceeds the increase in the percentage of starch is much greater than is accounted for by the decrease in the percentage of sugars. "From the beginning of kernel formation until the end of the ripening period there is a continual movement of sugar from the plant into the kernels, where it is transformed into starch."—D. Reddick.

730. ARLOING, F., et G. RICHARD. Sur les corpuscles métachromatiques des Corynebactéries (Bacilles diphtériques et pseudo-diphtériques). Cytologie expérimentale et comparée. [Concerning the metachromatic granules of the Corynebacteria (*Corynebacterium diptheriae* and *C. pseudo-diptheriticum*). Experimental and comparative cytology.] Rev. Gén. Bot. 33: 88-98. Fig. 1. 1921.—Studies were made on *Corynebacterium diptheriae* Loeffler and *C. pseudo-diptheriticum* Hoffman. It was found that the latter could not be made to form metachromatic granules under pressures of 1-3 atmospheres nor by raising the temperature to 38-40°C. Culturing this organism *in vivo* in collodion sacs in the peritoneum of the rabbit did not change it. Simultaneous seeding on the same tube of Costa-glucose media of 2 non-granular pseudo-diptheria cultures gave granular individuals. Polar granules were acquired by non-granular cultures on the addition of phosphates to the nutritive medium. Concerning the physiology of the granules, the following conclusions are drawn: The power of fermenting sugars is independent of the presence of the granules. The surface organisms are always more richly granular than the deep cultures in liquid media. The granulated individuals of the pseudo-diptheria organism are not pathogenic to the guinea pig. The granulated bacilli offer no more resistance to chemical, physical, or biological modifications than do the non-granulated. The action of bacteriolytic anti serums is more rapid on the cytoplasm of the cell than on the granules.—J. C. Gilman.

731. BEHRE, A. Die Bestimmungen von Glykose, Fructose, Saccharose und Dextrin nebeneinander. [Estimation of glucose, fructose, saccharose, and dextrin in presence of each other.] Zeitschr. Untersuch. Nahrungs- u. Genussmittel 41: 226-230. 1921.—The method described is said to be applicable to analyses of natural, adulterated, and artificial honeys.—E. E. Stanford.

732. BEZSSONOFF. Du principe antiscorbutique dans le jus de pomme de terre extrait en présence d'acides. [On the antiscorbutic principle in the potato which may be extracted with acids.] Compt. Rend. Acad. Sci. Paris 173: 417-419. 1921.—It has previously been established that uncrushed potato has a strong antiscorbutic action, whereas the expressed sap is very weak in this property. This is now found to be due to the activity of an oxydase. By adding a very weak acid the oxydase is paralyzed. By adding to 200 gm. of potato about 5 gm. of a mixture of 1 part citric or tartaric acid and 4 parts of cane sugar a sap was extracted which does not give unfavorable results.—C. H. Furr.

733. BOURQUELOT, E., et M. BRIDEL. Application de la méthode biochimique de recherche du glucose à l'étude des produits de l'hydrolyse fermentaire de l'inuline. [Application of the method for detecting glucose to the study of the products obtained by fermentative hydrolysis of inulin.] Jour. Pharm. et Chim. 23: 87. 1921.—When inulin is hydrolyzed by means of the inulase of *Aspergillus niger* reduction products are obtained which have practi-

ally the same rotatory power as fructose *d*, but which do not combine with methyl alcohol in the presence of emulsin. For, when to a methyl alcoholic solution of these products glucose and emulsin are added, the methyl alcohol combines with the glucose in only such quantities as would be expected if the added glucose were alone present. It appears, therefore, that by fermenting inulin no glucose is formed and that the carbohydrate consists of 2 molecules of fructose *d*.—*H. Engelhardt*.

734. CROCKER, E. C. An experimental study of the significance of "lignin" color reactions. *Jour. Indust. and Eng. Chem.* 13: 625-627. 1921.—The Maule reaction is found to be a convenient test for differentiation between the woods of angiosperms and gymnosperms. Evidence is presented to show that the color reactions are probably due to the presence of a single aldehyde which is not improbably coniferyl aldehyde.—*Henry Schmitz*.

735. DAMON, S. R. Bacteria as a source of the water-soluble B vitamine. *Jour. Biol. Chem.* 48: 379-384. 1921.—*Bacillus paratyphosus B*, *Bacillus coli*, and *Bacillus subtilis* do not produce the growth-promoting principle known as water-soluble B vitamin.—*G. B. Rigg*.

736. FLEMING, W. D. Vitamine content of rice by the yeast method. Organic nitrogen as a possible factor in stimulation of yeast. *Jour. Biol. Chem.* 49: 119-122. 1921.—The data presented are regarded as disproving a specific action of water-soluble B in stimulation of yeast growth.—*G. B. Rigg*.

737. FRED, E. B., W. H. PETERSON, and J. A. ANDERSON. The characteristics of certain pentose-destroying bacteria, especially as concerns their action on arabinose and xylose. *Jour. Biol. Chem.* 48: 385-411. 1921.—The pentose sugars, arabinose and xylose, are readily fermented by various strains of the lactic acid bacteria. These pentose-destroying bacteria are widely distributed in nature.—*G. B. Rigg*.

738. FUCHS, W. Über Lignin und den Sulfit-Kochprozess. [Lignin and the sulphite cooking process.] *Ber. Deutsch. Chem. Ges.* 54: 484-499. 1921.—This is a discussion of the probable structural formula of lignin.—*Henry Schmitz*.

739. FUNK, C., and H. E. DUBIN. Vitamine requirements of certain yeasts and bacteria. *Jour. Biol. Chem.* 48: 437-443. 1921.—A substance has been separated from vitamin B which is provisionally called vitamin D, and appears to be a definite and specific substance stimulating to the growth of yeast. *Streptococcus* is more difficult to study because apparently it needs at least 2 substances for growth.—*G. B. Rigg*.

740. GRÜNHUT, L. Nachweis und quantitative Bestimmung der Lävulinsäure in Lebensmitteln. [Demonstration and quantitative estimation of levulinic acid in foodstuffs.] *Zeitschr. Untersuch. Nahrungs- u. Genussmittel* 41: 261-280. 1921.—The author reviews previous work on levulinic acid. This acid is found in herbs (species not stated) used in war-time food substitutes, usually together with formic, lactic, and other organic acids.—*E. E. Snodgrass*.

741. HAWKINS, LON A. A physiological study of grapefruit ripening and storage. *Jour. Agric. Res.* 22: 263-279. 1921.—A study is made of the changes taking place in grapefruit (*Citrus arietinum*) when ripened on the tree, as compared with ripening in both warm (70°F.) and cold (32°F.) storage. Analyses were made for acids, total sugars, and reducing sugars. Record was kept of the various physical changes that took place.—In warm storage the percentage of acid present increases markedly within 2 months, while a slight decrease in sugar content is recorded. In cold storage the percentage of acid present decreases, and this is marked after 4 months. There is little change in the amount of sugar present. It is suggested that intramolecular respiration with the formation of acid may occur at the higher temperatures, especially as the oxygen pressure becomes reduced under the conditions of storage.—Fruits allowed to mature on the trees increase in palatability and in food value; but a point is

reached when, if picked and placed in storage, they become sweeter and less bitter. Acidity is lost and the naringin, the bitter principle, is broken down under storage conditions.—The pitting of grapefruit can be controlled by "curing" at 70°F. before placing the fruits in cold storage.—*D. Reddick.*

742. IEMMI, FUMIWO. On the occurrence of raffinose in the seeds of *Nelumbo nucifera* Gaertn. Jour. Coll. Agric. Hokkaido Imp. Univ. 9: 249-260. 1921.—The seeds of lotus are found to contain more raffinose than any other sugar; small quantities of glucose and sucrose are also present. The methods of extraction and isolation are given in detail.—*R. S. Nanz.*

743. HORTON, P. M. Preparation of mannose from ivory nut shavings. Jour. Indust. and Eng. Chem. 13: 1040-1041. 1921.

744. ITALLIE, E. L. VAN. *Viscum album*, eene urson-houdende plant. [*Viscum album*, a plant containing urson.] Pharm. Weekblad 58: 824. 1921.—When *Viscum album* is extracted with alkaline methyl alcohol and the alcoholic solution rendered acid with acetic acid, a precipitate is obtained which after recrystallization was found to be urson, a substance present in the Ericaceae but never found in the Loranthaceae.—*H. Engelhardt.*

745. JONESCO, ST. Les anthocyanidines, à l'état libre, dans les fleurs et les feuilles rouges de quelques plantes. [Anthocyanidines in the free state in red leaves and flowers of certain plants.] Compt. Rend. Acad. Sci. Paris 173: 426-429. 1921.—The colors of the flowers of *Pelargonium* and of *Papaver* and the leaves of *Prunus* are due to the presence of anthocyanidines in the free state. These substances exist side by side with the anthocyanins and other pigments which go together to make up the red color. The presence of anthocyanidines in the colored organs of plants is held to indicate their close relationship to the anthocyanins; and it is concluded that the former are derived from the latter by hydrolysis. [See also following entry.]—*W. K. Farr.*

746. JONESCO, ST. Sur l'existence d'anthocyanidines à l'état libre dans les fruits de *Ruscus aculeatus* et de *Solanum Dulcamara*. [On the existence of anthocyanidines in a free state in the fruits of *Ruscus aculeatus* and *Solanum Dulcamara*.] Compt. Rend. Acad. Sci. Paris 173: 168-171. 1921.—Anthocyanins were shown by Willstätter to be all of similar constitution, being mono- or diglucosides, derivatives of β phenylbenzo- γ -pyrylium. They differ among themselves in the number and position of the different hydroxyl and methyl groups. Anthocyanine and anthocyanidine are both present and may be distinguished by certain tests which are given. Both are found in a free state in these 2 fruits and also in the flowers and red leaves of some plants. [See also preceding entry.]—*C. H. Farr.*

747. KOZŁOWSKI, ANTOINE. Sur la saponarine chez le *Mnium cuspidatum*. [Saponarine in *Mnium cuspidatum*.] Compt. Rend. Acad. Sci. Paris 173: 429-431. Fig. 1-3. 1921.—This substance, which gives the starch reaction with iodine, was formerly considered to be soluble starch, but it is now regarded as identical with the saponarine of *Saponaria officinalis*. Molisch found it in only one of 37 species of hepatics. It is now found to be present in this moss. Microchemical tests are given and the figures illustrate the form of the crystals produced by treatment with iodine.—*W. K. Farr.*

748. LINSBAUER, KARL. Bemerkungen über Alfred Fischer's "Gefässglykose." [Notes on Fischer's "vessel glucose."] Sitzungsber. Akad. Wiss. Wien (Math.-Nat. Kl.) Abt. 1. 129: 215-229. 3 fig. 1920 [1921].—From the fact that a substance which was neither resin nor tannin caused reduction of Fehling's solution in the non-living elements of woody stems, particularly the vessels, Fischer concluded that this substance was glucose and gave it the name "vessel-glucose." His view was accepted by Strasburger and it appears in many botanical texts. Subsequent observations show that this reduction of Fehling's solution may be observed in wood generally, largely irrespective of age, time of year, and living or non-living con-

dition, although it is absent in herbaceous vessels. It is particularly evident in the middle lamella whenever the test is carried out according to Fischer's procedure. The present author demonstrated that the reducing substance is not appreciably soluble in any glucose solvents, and that its apparent amount can be increased by prolonged boiling in water. He ascribes the reduction of Fehling's solution to a hydrolytic change which occurs naturally in the aging of wood and is hastened by the boiling incident to carrying out Fehling's test.—*F. Weiss.*

749. McCLENDON, J. F., and A. C. HENRY. The relation of soil fertility to vitamin content of grain. *Science* 54: 469-470. 1921.—Oats and barley were grown on different soils with varying contents of available P_2O_5 . The resulting grain was added to a basic ration and fed to white rats. The grain grown on the P_2O_5 -rich soil contained about twice as much P_2O_5 as the grain from the P_2O_5 -poor soil. The feeding tests showed that the grain with more P_2O_5 gave more growth in the rats as measured by live weight. During the last half of the 65-day test, butter fat was added to the ration; the resulting difference in growth was then apparently due to the difference in vitamin B.—*C. J. Lyon.*

750. MAESTRINI, D. Un nuovo metodo di colorazione della cellulosa e la sua importanza nella ricerca della citasi. [A new method for the staining of cellulose and its value in the detection of cytase.] *Arch. Fisiol.* 29: 83-88. *Pl. 1.* 1921.—The fresh sections are kept in 20 per cent formic acid for 12-24 hours and are then immersed for 30-40 minutes in a 0.1 per cent solution of gold chloride rendered slightly acid by means of formic acid. Repeated microscopic examinations will reveal the critical moment when washing with distilled water may be begun, glass section-lifters only being used. Differential staining is obtained by the use of Esbach's reagent instead of formic acid as a mordant, the subsequent technique not being changed. By the use of this method the author was able to show that in germinating barley the wall cellulose was not lost, whereas this compound disappeared when the tissues were kept in manure infusions, the presence of unstained centers indicating a solution of the cellulose.—*A. Bonazzi.*

751. MYERS, V. C., and HILDA M. CROLL. The determination of carbohydrates in vegetable foods. *Jour. Biol. Chem.* 46: 537-551. 1921.

752. PALMER, L. S., and CORNELIA KENNEDY. The relation of plant carotinoids to growth and reproduction of albino rats. *Jour. Biol. Chem.* 46: 559-577. 1921.—The data reported show irreconcilable divergencies from the view that vitamin and carotinoid are identical. The 2 substances are not even quantitatively associated in the plant tissues in which both are presumably synthesized.—*G. B. Rigg.*

753. ROSE, A. R. The inversion and determination of cane-sugar. *Jour. Biol. Chem.* 46: 529-535. 1921.

754. SANDO, CHARLES E., and H. H. BARTLETT. Notes on the organic acids of *Pyrus coronaria*, *Rhus glabra*, and *Acer saccharum*. *Jour. Agric. Res.* 22: 221-229. 1921.—The predominating acid of fresh fruits of *Pyrus coronaria* is malic. After autolysis of the fruit under anaerobic conditions, with chloroform and toluol present, succinic acid is present almost to the exclusion of malic. It is thought that the transformation is brought about by the action of enzymes of the fruit itself.—The acid of the sour, red pericarp of fruits of *Rhus glabra* is malic, principally in the form of the acid calcium salt.—The product found in evaporating pans for the concentration of sap of *Acer saccharum* and known as "maple sand" is crude calcium malate.—*D. Ruddick.*

755. SCHWALBE, K. G., and E. BECHER. Unterscheidung von Oxy- und Hydrocellulosen durch Titration. [Distinguishing between an oxy- and a hydrocellulose by means of titration.] *Ber. Deutsch. Chem. Ges.* 54: 545-550. 1921.—Oxycellulose and hydrocellulose can be distinguished by first boiling the sample in distilled water, adding a few cc. of concentrated NaCl

and a few drops of methyl orange. Oxycellulose gives a red color reaction, hydrocellulose a yellow one.—*Henry Schmitz.*

756. SWANSON, C. O. Hydrocyanic acid in Sudan grass. Jour. Agric. Res. 22: 125-133, 1921.—Practically all the hydrocyanic acid is in the leaves of this grass (*Andropogon Sorghum* var.) and it is more abundant in young plants than in old ones. The acid does not exist free, and its liberation is intimately associated with enzyme action. Liberation of the acid begins as soon as the plant is macerated or is wilted. Sudan grass contains less hydrocyanic acid than sorgo or Kafir (*Andropogon Sorghum*).—*D. Reddick.*

757. ULTEE, A. J. Amyrin und Lupeol in Kautschuk von *Ficus Vogelii*. [The presence of amyrin and lupeol in the caoutchouc of *Ficus Vogelii*.] Ber. Deutsch. Chem. Ges. 54: 784-785, 1921.—The 2 bodies mentioned are demonstrated.—*Henry Schmitz.*

758. WORK, PAUL. Effects of nitrate of soda on the nutrition of the tomato. Proc. Amer. Soc. Hort. Sci. 17: 138-146. 1920 [1921].—Tomato plants were grown during the summer and again during the fall of 1920 in boxes containing about 1½ bushels of quartz sand, with control plants in soil. Nutrients other than nitrogen were added in supposedly "favorable excess." Nitrate of soda was applied in amounts varying from 0 to 256 gm. per box. Chemical analyses were made of the leaves. Nitrogen and carbohydrate content are expressed as percentages of the green weight. The data indicate that: (1) Young plants in greenhouse soil have the highest nitrogen content. (2) Plants in active growth exhibit a nitrogen content above 0.3 per cent whether treated with 256 or 8 gm. of nitrate. (3) Low nitrogen treatment "gave external evidence of advanced starvation, while intermediate figures were associated with plants that seemed to have entered upon such a decline." That excessive nitrate applications were osmotically injurious rather than poisonous was indicated by more pronounced wilting, stunting, and blossom end rot during the summer. The latter trouble was checked when the water content of the sand was increased. There was a range in carbohydrate content from 0.92 to 5.97 per cent. "High carbohydrate content occurs in most but not all starved plants. The range from 0.92 per cent to 3.66 per cent seems to show plants in all categories of vegetation, fruitfulness, and nitrogen content. Thus, barring the starved sets, there appears to be little if any correlation between this factor and plant performance."—Many suggestions are made as to the nitrogen-carbohydrate relationship existing under the conditions of the experiments. The author also draws special attention to the desirability of analyses of successive samples from the same plants.—*H. A. Jones.*

METABOLISM (NITROGEN RELATIONS)

759. BAUDISCH, O. The mechanism of reduction of nitrates and nitrites in processes of assimilation. Jour. Biol. Chem. 48: 489-502. 1921.—Nitrosyl is formed from alkali nitrates photochemically and by reduction with glucose in the presence of iron and by reduction with ferrous hydroxide in the presence of oxygen. The formation of carbon and nitrogen organic compounds in green plants and bacterial cultures from inorganic nitrogen, and the production of N_2O , N_2 , NO , and HCN during fermentation and photochemical reduction may be explained by the intermediate formation of nitrosyl and its subsequent reaction with aldehydic combinations. Nitrosyl is written $H[NO]$, the bracket indicating the labile character.—*G. B. Rigg.*

760. DAKIN, H. D. The synthesis of inactive para- and anti-hydroxyaspartic acids (aminomalic acids). Jour. Biol. Chem. 48: 273-291. 1921.

761. DOWELL, C. T., and P. MENAUL. Nitrogen distribution of the proteins extracted by dilute alkali from pecans, peanuts, kafir, and alfalfa. Jour. Biol. Chem. 46: 437-441. 1921.—It seems possible that the extraction of proteins with dilute alkaline solutions may make possible the determination of the amino-acid composition of foods by means of the Van Slyke method of analysis.—*G. B. Rigg.*

762. JONES, D. B., and H. C. WATERMAN. The basic amino-acids of glycinin, the globulin of the soy bean, *Soja hispida*, as determined by Van Slyke's method. Jour. Biol. Chem. 46: 459-462. 1921.

763. MENDEL, LAFAYETTE B. Chemical factors in nutrition. Jour. Franklin Inst. 192: 1-10. 1921.—This is a discussion of animal nutrition, especially emphasizing the more recent advances in the study of the importance of the amino-acids, likewise the relations of these cleavage products in the digestion of food proteins.—*Ernest Shaw Reynolds*.

764. OSBORNE, T. B., A. J. WAKEMAN, and C. S. LEAVENWORTH. The proteins of the alfalfa plant. Jour. Biol. Chem. 49: 63-91. 1921.—It is possible to grind the fresh green alfalfa plant so thoroughly that practically all of the contents of its cells can be subsequently extracted by water, alcohol, dilute aqueous alkali, and hot alkaline alcohol, applied in the order named. The various groups of substances soluble in the several solvents are thus separated under conditions particularly favorable for further investigation.—*G. B. Rigg*.

METABOLISM (ENZYMES, FERMENTATION)

765. ANONYMOUS. [Rev. of: DIEHL, H. S. The specificity of bacterial proteolytic enzymes and their formation. Jour. Infect. Diseases 24: 347-361. 1919 (see Bot. Absts. 3, Entry 818).] Rev. Bact. 9: 72. 1919.

766. BRIDEL, MARC. Action de l'émulsine sur le galactose en solution dans des alcools propyliques de different titres. [The action of emulsin on galactose in solutions of propyl alcohols of different strengths.] Jour. Pharm. et Chim. 24: 209. 1921.— β galactosidase, a ferment present in the emulsin of bitter almonds which acts on β galactosides, is rapidly destroyed at 30°C. by propyl alcohol up to 45 per cent strength, but resists stronger alcohols. It retains its activity at ordinary temperature in propyl alcohol of any strength. The amount of galactose which combines with the alcohol at first increases in proportion to the strength of the alcohol, but then, especially in from 45 to 55 per cent alcohol, decreases on account of the destruction of the ferment by the alcohol. In alcohols of 67, 70, and 75 per cent strength, the amount of galactose combining with the alcohol increases again, and with 75 per cent alcohol almost 80 per cent of the sugar is combined.—*H. Engelhardt*.

767. BRIDEL, MARC, et Mlle. MARIE BRAECKE. Sur la présence d'un glucoside dédoublable par l'émulsine dans deux espèces du genre *Melampyrum*. [The presence of a glucoside which may be broken up by emulsin in two species of *Melampyrum*.] Compt. Rend. Acad. Sci. Paris 173: 414-416. 1921.—The blackening of leaves of *Melampyrum* during dessication is attributed to the presence of a glucoside. This glucoside has not yet been extracted in pure form, but it is suggested that it may be aucubine.—*C. H. Farr*.

768. CROCKER, WILLIAM. Increasing catalase activity in yeast cells. [Rev. of: EULER, H. V., and R. BLIX. Verstärkung der Katalasewirkung in Hefezellen. [Increasing catalase activity in yeast cells.] Zeitschr. Physiol. Chem. 105: 83-114. 1919 (see Bot. Absts. 4, Entry 1506).] Bot. Gaz. 69: 356-357. 1920.

769. CROCKER, WILLIAM. Fermentation. [Rev. of: EULER, H., and O. SVANBERG. Enzymatische Studien über Zuckerspaltungen. [Enzymatic studies in sugar cleavage.] Zeitschr. Physiol. Chem. 105: 187-239. 1919 (see Bot. Absts. 4, Entry 1507).] Bot. Gaz. 69: 358. 1920.

770. FRED, E. B., and W. H. PETERSON. The fermentation process for the production of acetic and lactic acids from corncobs. Jour. Indust. and Eng. Chem. 13: 211-213. 1921.—A syrup containing from 30 to 40 per cent xylose is prepared by hydrolyzing corncobs with dilute sulphuric acid. The xylose is fermented almost quantitatively by *Lact. bacillus pentosæticus* n. sp. with the production of acetic and lactic acids.—*Henry Schwartz*.

771. GAYDA, TULLIO. Ricerche di calorimetria. [Calorimetric researches.] Arch. Fisiol. 29: 1-32. Fig. 1-4. 1921.—A microcalorimeter is described and some experiments given wherein this apparatus was used for the study of caloric changes in various chemical reactions.—A. Bonazzi.

772. HÉRISSEY, H. Action synthétisante de la α methyl-d-mannosidase. [Synthesizing action of α methyl-d-mannosidase.] Jour. Pharm. et Chim. 24: 321. 1921.— α Methyl-d-mannosidase exerts a synthesizing action leading to the formation of α methyl-d-mannosite. The isolation of the latter can, however, be perfected only by working up great quantities of mannose, and the process presents other difficulties both when the sugar is present in large excess and when the fermentation liquids obtained from germinating lucerne are strongly contaminated with impurities.—H. Engelhardt.

773. HÉRISSEY, H. Sur l'hydrolyse du methyl-d-mannoside par les ferments solubles. [Hydrolysis of methyl-d-mannosite by the soluble ferments.] Jour. Pharm. et Chim. 23: 409. 1921.—Emulsin of almonds, the soluble ferments of *Aspergillus niger*, beer yeast, and the soluble ferments of germinated lucerne seeds were allowed to act on the sugar. It was found that by the last named ferment the best results are obtained, which is probably due to the presence of seminase in the ferments. Seminase is defined as the soluble ferment, or a group of soluble ferments, which converts the reserve carbohydrates of the horny albumin of the Leguminosae into assimilable sugars. Most of these carbohydrates consist of mannases, i.e., of carbohydrates, which, like the d-mannosides, give d-mannose on hydrolysis; d-mannosidase probably is present not only in lucerne seeds but also in numerous other seeds of the Leguminosae and other plant families which contain horny albumin.—H. Engelhardt.

774. HUNTER, CHARLES A. Bacteriological and chemical studies of different kinds of silage. Jour. Agric. Res. 21: 767-789. 8 fig. 1921.—From field and laboratory studies which are reported in detail the following conclusions are made: (1) Bacteriologically or chemically there is little difference between the fermentations taking place in silages composed of Canada field pea and oats, of maize and soybean, or of maize alone. The largest number of organisms of the "bulgaricus group" occur in maize silage; (2) production of acid is due to microorganisms; (3) yeasts have little effect except for the first few days; (4) enzymes are chiefly responsible for the hydrolysis of protein with the formation of amino nitrogen; (5) the formation of ammonia is due to native enzymes and to microorganisms.—D. Reddick.

775. MIRANDE, MARCEL. Extraction et nature de la substance sulphydrique dans les graines de certaines Papilionacées. [Extraction and nature of the substance in leguminous seeds which produces hydrogen sulphide.] Compt. Rend. Acad. Sci. Paris 173: 252-253. 1921.—In this continuation of the author's studies [see Bot. Absts. 10, Entries 251, 281] it is found that autofermentation of bruised or moist seeds takes place between 35 and 55°C., and is arrested at the average temperature for the coagulation of the albumen. Above this temperature the liberation of H₂S occurs when the material is boiled in water, especially if the medium has an acid reaction. A description is given of the method of extracting from *Lathyrus sativus* a substance, giving off H₂S, which seems to be of the nature of a protein. It is concluded, however, that the sources of the H₂S are compounds other than cystin, compounds which contain sulphur and which lose labile S in the formation of H₂S. —C. H. Farr.

776. PETERSON, W. H., E. B. FRED, and J. H. VERHULST. A fermentation process for the production of acetone, alcohol and volatile acids from corncobs. Jour. Indust. and Eng. Chem. 13: 757-759. 1921.—Corncobs may be utilized for the production of acetone, ethyl alcohol, and formic and acetic acids by fermenting the syrup obtained by hydrolysis of the cobs by *Bacillus acetohylicum*. It is important that the reaction of the medium be between P_H 7.6 and 8.4 at the beginning of the fermentation and that an abundance of calcium carbonate be present to neutralize the acids formed.—Henry Schmitz.

777. WOOD, T. The properties and action of enzymes in relation to leather manufacture. Jour. Indust. and Eng. Chem. 13: 1135-1137. 1921.—The action of the bacteria present in the various liquors used in connection with the manufacture of leather is discussed.—*Henry Schmitz.*

METABOLISM (RESPIRATION, AERATION)

778. MAQUENNE, L., et E. DEMOUSSY. Sur la respiration des feuilles dans le vide ou des atmosphères pauvres en oxygène. [The respiration of leaves in a vacuum or in an atmosphere low in oxygen.] Compt. Rend. Acad. Sci. Paris 173: 373-377. 1921.—The effect of very small amounts of oxygen added to media or produced by photosynthesis was studied. Leaves of *Azucuba* and pear in a darkened vacuum show blackening in 3 or 4 days. If air is then admitted they blacken completely in less than 2 hours and die. In an atmosphere of 0.8 per cent oxygen, that is, with 2 cc. of air in a 50 cc. tube, the leaves survive 4-5 days. But if 2 per cent, or 5 cc., of oxygen is present the leaves survive 8-9 days. It is concluded that intracellular and normal respiration respectively, which some authors have contended have a common cause, are really to be attributed to different conditions and are to be considered as autonomous functions of the plant.—*C. H. Farr.*

779. SHEARER, C. On the amount of heat liberated by *Bacillus coli* when grown in the presence of free amino-acids. Jour. Physiol. [London] 55: 50-60. 1921.—There is little energy loss in the media containing amino acids compared with that in glucose-peptone broth, and less in the peptone media the longer the tryptic broth is digested.—*Ernest Shaw Reynolds.*

ORGANISM AS A WHOLE

780. BOKORNY, TH. Zur Kenntnis der physiologischen Fähigkeiten der Algengattung *Spirogyra* und einiger anderer Algen. Vergleich mit Pilzen. [The physiological properties of the algal genus *Spirogyra* and of several other algae. Comparison with fungi.] Hedwigia 59: 340-393. 1918.—On the whole this is a compilation of known facts relating to the physiology of algae, fungi, and higher plants. Some new work upon the physiology of the genus *Spirogyra* is included. The nutritive value of 22 forms of carbohydrate, including mono-, di-, tri-, and polysaccharides, is compared for algae, fungi, and higher plants. Data on the ability of such organisms to grow upon 24 miscellaneous organic solutions, upon 17 amino acids as nitrogen sources, and upon 16 organic acids are likewise correlated and discussed. Ten gm. of *Spirogyra nitida* used 168 mg. of glycerine in 10 days when grown upon a solution containing 5 drops of pure glycerine, 250 cc. of water, and 0.65 per cent KH_2PO_4 and KCl . A concentration of 0.001 per cent formaldehyde did not inhibit the growth of this species of *Spirogyra*. Algae as a class were found to have a low fat content when compared with yeasts, higher plants, and fungi.—*F. S. Wolpert.*

781. CAULLERY, MAURICE. La symbiose chez les animaux. [Symbiosis in animals. Bull. Inst. Pasteur 19: 569-583, 617-627. 1921.—From a botanical standpoint this review by Caullery is of special interest, since it deals with the specific adaptation of plant symbionts (algae, yeasts, and bacteria) to the condition of intracellular existence in animal hosts. Thus, the relationship *Zooxanthella* and *Zoochlorella* versus Rhizopoda, Flagellata, Infusoria, sponges, Rotiferae, Coelenteratae, Turbellariae, Annelidae, Bryozoa, molluscs, etc., is considered. Caullery accepts as definitely proved the view that *Zoochlorellae* and *Zooxanthellae* are autonomous Protozoaceae algae adapted to intracellular life and also capable of development outside the cell; he points nevertheless to the function of these organisms as still problematical, as is also the relationship existing between the Molgulides and the Chytridinae, the latter found over, and in, the renal concretions of these animals. Interesting from a botanical standpoint is the whole group of intracellular yeasts which have repeatedly been found in the intestinal tract of the haemophagous insects living on a strictly haemophylic diet, especially as to whether these yeasts facilitate the digestion of the cellular elements of the ingested blood. Again Caullery points to the direct relationship existing between the

plant juice-sucking insects and the nearly constant presence of a yeast-like intracellular organism which has repeatedly been pictured and described by zoologists as the pseudovitellus, pseudova, and vitellus secundarius in the plant lice. Further, the studies and observations of Pierantoni, Dubois, Tirpolo, and others have shown that the light-producing marine and fresh water animals harbor in their light-producing organs bacillus-like forms which have been isolated and found to be autonomous and luminiferous "organisms." Caullery lays stress upon the importance of careful investigations upon the entomophytic flora and the study of its function, and indicates that from the standpoint of general biology the question becomes especially important when considered in the light of the recent theories of mitochondria and the question of aseptic life. A list of the literature is appended.—*A. Bonazzi*.

782. CHRISTOPH, HERM. Untersuchungen über die mykotropen Verhältnisse der Ericales und die Keimung von Pirolaceen. [The mycorrhizal relationships of the Ericales, and the germination of the Pirolaceae.] Beih. Bot. Centralbl. 38: 115-157. Pl. 8, 1921.—Cuttings of *Calluna vulgaris* were placed in sterile and non-sterile soil (peat). In the latter 1 infection developed, but none in the former. Later, half of these were transferred to a pot with a gray sandy loam. These were well-grown plants when 2½ years old. The entire root system was found to be infected; some epidermal cells and the tip remained uninfected.—Plants from the sterile culture were placed in the same sandy loam but sterilized. In this case no infection was found, although at first these had to contend with surface growths of *Penicillium* and *Aspergillus*. The absence of mycorrhiza and the state of development of these plants showed that the fungus was not necessary to their growth. Similar experiments with *Erica cornuta* cuttings and seed cultures of *Calluna vulgaris* gave similar results. The fungus is a comparatively harmless parasite on these plants.—The coralloid roots of such forms as *Arctostaphylos uva-ursi* are due to ectophytic mycorrhiza, the fungus living on the epidermal cells. In the *Pirola* species the organism enters from the outside but develops an intercellular mycelium which later infects the epidermal cells. Ectophytic mycorrhiza are found only where underground parts are differentiated into roots and rhizome, and only then in rich humous soils. The fungus is harmless here in the beginning, but when conditions are favorable it becomes injurious. The *Monotropa* species are also facultative hosts to these fungi.—The seed of *Pedicularis rotundifolia* germinate without the fungus. The development of the seedling depends on many factors and more work must be done to determine certain relations.—*L. Pacc*.

783. GICKLHORN, JOSEF. Studien an Eisenorganismen. Über die Art der Eisenspeicherung bei Trachelomonas und Eisenbakterien. [Iron organisms. The manner of iron storage in Trachelomonas and iron bacteria.] Sitzungsber. Akad. Wiss. Wien (Math.-Nat. Kl. Abt. 1. 129: 187-213. 5 fig. 1920 [1921].—The formation of Prussian blue from a test for FeO_3 compounds may be shown in both *Trachelomonas* and in *Leptothrix* in 1 of the 3 following types: (1) Localized in the iron-containing structures, (2) as a granular precipitate surrounding the organism, or (3) as Traube cells of variable form and size developed from the sheath. Storage of iron occurs only through the agency of the living protoplast, but iron may be deposited in the shell or slime-sheath. FeO compounds occur in the shell but not in the protoplast of *Trachelomonas*. Ferrons or ferrie iron in either inorganic or organic combination may be taken up by the protoplast, and oxidation to FeO_3 is not dependent on atmospheric oxygen but is controlled by life processes. Although the presence of iron compounds in these organisms is not to be regarded as evidence of their use as an energy source, yet the protoplast regulates the intake of iron and the accumulation is not merely passive.—*P. Weiss*.

784. HAMM, TAKEWO. Beiträge zur Kenntnis der Morphologie und Physiologie der japanischen Gleosporien. [The morphology and physiology of the Japanese Gleosporias.] Jour. Coll. Agric. Hokkaido Imp. Univ. 9: 1-59. Pl. 3. 1920.—A complete morphological description and a short historical survey are given, together with the author's observations on the taxonomic position of 43 strains of these anthracnose-producing organisms. Extensive cultural experiments were performed using 49 strains from 34 cultivated host plants and a number of wild ones. The fungi were grown in mineral nutrient solutions to which aspartum

sugars, and other organic substances were added. The optimum concentration of sucrose was 5-8 per cent; of glucose about 5.7 per cent. The maximum concentration of sucrose was between 60 and 70 per cent. Glycerine as a carbon source affords poor growth. Using 5 per cent sucrose the optimum concentration of asparagin as a source of nitrogen was 0.5-0.9 per cent. The maximum temperature was between 30 and 40°C., varying with other conditions. Conidia of the *Gleosporium* group will withstand a much higher temperature in a dry atmosphere than in a moist one, a temperature of 89°C. in dry air being insufficient to kill them, while a moist atmosphere of 57° will cause death in 10 minutes. The effect of citric, malic, and acetic acids is practically the same for a given organism, although different species vary in their ability to grow in the presence of these acids. For example, N/8 acetic acid prevented the growth of *Colletotrichum Lindemuthianum* while a *Gleosporium* from the apple grew more vigorously in N/8 acetic and malic acids than in the control nutrient solution; others are able to thrive even in N/2 citric and acetic acids. A bibliography of 148 citations is appended.—R. S. Nanz.

785. HERZFELD, E., and R. KLINGER. *Neuere eiweisschemische Vorstellungen in ihren Beziehungen zur Immunitätslehre.* [Modern conceptions of protein chemistry in their relations to the theory of immunity.] *Ergebn. Hygiene Bakt. Immunitätsf. u. Exp. Therap.* 4: 283-310. 1920.—Recent work in colloid chemistry and the physico-chemical properties of the proteins is applied to the immunity phenomena.—W. H. Chambers.

786. LAKON, GEORG. *Goethes physiologische Erklärung der Pflanzenmetamorphose als moderne Hypothese von dem Einfluss der Ernährung auf Entwicklung und Gestaltung der Pflanze.* [Goethe's physiological explanation of plant metamorphosis as a modern hypothesis concerning the influence of nutrition on development and formation of plants.] *Beih. Bot. Centralbl.* 38: 158-181. 1921.—This is an inaugural address delivered March 12, 1919, at the Technischer Hochschule in Stuttgart.—The author contends that the scientist has usually given little thought to Goethe's scientific writings. He has passed them by as the dilettante product of a poet. The author takes Goethe's statements and compares them point by point with the modern view in arriving at the conclusion that Goethe is remarkably modern in his views.—L. Pace.

GROWTH, DEVELOPMENT, REPRODUCTION

787. BRENCHELY, WINIFRED E. *On the relations between growth and the environmental conditions of temperature and bright sunshine.* *Ann. Appl. Biol.* 6: 211-244. 1920.—These tests were made with peas in water cultures, the cultures exposed in a roof greenhouse, with records kept for 16 months of the temperature and light prevailing and the hours of bright sunshine. One group of plants was grown in nutrient solutions which were changed weekly, the other group in solutions which remained unchanged. Growth is divided into 2 periods, the 1st from the seedling stage till the plant regains its initial weight after the loss by respiration, and the 2nd from that time till growth ceases.—The following points were brought out by the experiment: Length of the 1st period varies inversely with mean maximum temperature; growth, measured by dry matter produced, depends directly upon sunshine and temperature, up to a certain limit, when food is plentiful; rate of growth in the 1st period is associated with relatively warm days and nights, and in the 2nd with sunshine and warm days; the maximum rate of growth, except during winter, is reached very soon after the 2nd period begins, but is later influenced by environmental conditions; food supply makes little difference in the response of plants to environmental conditions, although less total growth is made when food is scarce; in the 1st period root weight increases and shoot weight decreases, but in the 2nd period the reverse is true, the rise in temperature having a less favorable effect on roots than on shoots; the nitrate absorption by plants is greater in proportion to dry matter produced in the 1st period, and less in the 2nd period.—H. C. Sherman.

788. BRIGGS, G. E., FRANKLIN KIDD, and CYRIL WESF. *A quantitative analysis of plant growth. Part I.* *Ann. Appl. Biol.* 7: 103-123. 1920.—This is the first instalment of a series

of articles attempting to formulate methods of quantitative analysis of plant growth and to apply these methods to data which have been lying dormant in physiological literature for 40 years. The relative growth rate curve, which is the weekly percentage increase in dry-weight plotted against time, and also the leaf area ratio curve, have been employed. As a typical example of an annual plant maize has been selected, since data are given by Kreusler for this plant grown in 4 successive years. The fact that the curve for leaf-area per unit dry-weight throughout the season shows a correspondence with the rate-growth curve indicates that the physiological basis for increased and decreased relative rate of growth is a corresponding change in the assimilating area per unit of dry weight. This is to be dealt with further in future papers. It seems apparent for maize that the seedling leaves do not perform their normal assimilatory function until some time after their appearance. [See also following entry].—*H. D. Barker.*

789. BRIGGS, G. E., FRANKLIN KIDD, and CYRIL WEST. A quantitative analysis of plant growth. Part II. *Ann. Appl. Biol.* 7: 202-223. 6 fig. 1920.—This is a continuation of results obtained in experiments on the rate of growth in maize [see preceding entry]. The rate of growth is expressed per unit leaf-area. The term "unit leaf-rate" is used for the weekly rate of increase of dry-weight in mg. per square cm. This unit leaf-rate is found to fluctuate about a mean and is more closely correlated with temperature than with light. Values for "real assimilation" also showed a closer correlation with temperature than with light. These values, determined from the unit leaf-rate, were, in *Helianthus*, of a lower order than those determined by the "half-leaf" method, but higher than those determined by the "gasometric" method. A list of 22 references is included.—*E. B. Lambert.*

790. BRIGGS, G. E., FRANKLIN KIDD, and CYRIL WEST. Methods in the quantitative analysis of plant growth. *Ann. Appl. Biol.* 7: 403-406. 1921.—The authors' reply to a criticism by Fisher [see following entry] of the methods of calculation used by them in a previous article on the analysis of plant growth [see preceding two entries].—*C. R. Hursh.*

791. FISHER, R. A. Some remarks on the methods formulated in a recent article on "the quantitative analysis of plant growth." *Ann. Appl. Biol.* 7: 367-372. 1921.—A paper by Briggs, Kidd, and West on the analysis of plant growth [see Bot. Absts. 11, Entries 788, 789] is criticized. The methods of calculation used by these authors are considered to be inaccurate. [See also preceding entry].—*C. R. Hursh.*

792. IDE, M. The "bios" of Wildiers and the cultivation of yeast. *Jour. Biol. Chem.* 46: 521-523. 1921.—There are 2 kinds of proliferation of yeast, one very slow without "bios" and one fast with "bios." It is believed that a special "biosine" allows a proliferation 30 times more rapid, and that for rapid growth yeast needs a large proportion of its nitrogen in this form. No difference has been observed in the chemical properties of the water-soluble B of Myers and Voegtlin and "biosine."—*G. B. Rigg.*

793. REED, H. S. Correlation and growth in the branches of young pear trees. *Jour. Agric. Res.* 21: 849-876. Pl. 142. 1921.—Working under the climatic and other conditions of Riverside, California, certain Bartlett pear trees were headed back each year from the time of planting in 1916, while others were not pruned after the year in which they were planted. The paper reports the growth during 1919 from pruned 1918 shoots on the pruned trees and from unpruned 1918 growth of the unpruned trees. None of the trees had produced any fruit up to the time the measurements were made. The measurements were on 270 pruned mother shoots on 91 trees that had been headed back each year from the beginning, and 54 unpruned mother shoots on trees that had been pruned only at planting. Curves and tables show frequency distribution of total shoot growth on mother shoots, the mean length of lateral on pruned and unpruned trees, total production of laterals on mother shoots possessing varying numbers of buds, length of mother shoots plus total length of new wood produced on them, mean length of laterals produced on mother shoots, frequency distribution of mean lengths

of certain laterals, variability in the production of fruit spurs on mother shoots, and the distribution of fruit spurs on 2 classes of mother shoots of approximately equal length.—More growth was made on the pruned mother shoots. From certain calculations the author concludes that if the shoots on the trees that were headed back each year had not been pruned in the spring of 1919 they would have made no more new shoot-growth than the shoots on the trees that had not received annual heading back, and therefore that the pruning in the spring of 1919 had caused increased growth. After discussing other possible ways by which the pruning could have increased the growth he concludes that "The growth response indicates that increased growth following pruning is due to the removal of regions containing, or producing, substances which would otherwise tend to inhibit growth of other members of the system. Each mature bud on the mother shoot seems capable of developing into a lateral provided it be sufficiently free from growth-inhibiting substances."—Annual heading back did not seem to dwarf the trees. Thus, the average trunk girth of the unpruned trees was 16.6 ± 0.2 cm., and of the pruned ones 16.2 ± 0.3 cm.—W. H. Chandler.

MOVEMENTS OF GROWTH AND TURGOR CHANGES

794. ANONYMOUS. [Rev. of: DUTROCHET, RÉNÉ. *Les mouvements des végétaux. Du reveil et du sommeil des plantes. xiii + 121 p. Gauthier-Villars et Cie.: Paris, 1921.*] Sci. Prog. [London] 16: 335. 1921.

795. BÜSGEN. Tropismen und exzentrisches Dickenwachstum der Bäume. [Tropisms and excentric diameter growth of trees.] Zeitschr. Forst- u. Jagdw. 51: 43-44. 1919.—This is a very brief review of the section of Arnold Engler's *Ein Beitrag zur Physiologie und Morphologie der Holzgewächse*, 1918, in which Engler gives the results of his investigations on the heliotropic and geotropic movements of branches and stems. The general knowledge of incurvation in woody plant parts is very meager; for example, no explanation has been given as to why hardwoods do not show the same excentricity of growth on the underside due to stimulated cambial activity induced by longitudinal crushing strains as do conifers. Engler furnishes a valuable contribution in the perception, examination, and identification of phenomena which exercise a vast influence in the technical properties of wood.—J. Roemer.

796. GESCHER, N. VON. Über die Bewegungen der Sprossspitze und die Wuchsform von zwei Oenotheren. [The movements of the shoot tip and the growth form of two *Oenotheras*.] Beih. Bot. Centralbl. 38: 204-216. Fig. 1-5. 1921.—These are the results of many observations and some experiments with *Oenothera amoephila* and *O. cruciata*, which show a striking inclination of the main axis. Experiments with plants grown in the dark showed that bending is not a light response as it develops also in the dark. The upper part of the shoot exhibits photonastic movements that reach a maximum at the flowering period and disappear at the close of this period. With one-sided lighting, as in sunny positions, the tip turns in the direction of the strongest light; the bending also takes place in this direction. A simultaneous reaction from a light stimulus and gravitation follows in 2 different zones.—L. Pecc.

797. GUTTENBERG, H. VAN [VON]. Why roots grow downward. Sci. Amer. Monthly 3: 311-314. Fig. 1-2. 1921. [Translated from *Naturwissenschaften* July 16, 1920 (see Bot. Absts. 7, Entry 1364).]—For the most part this is an historical review of the modern statolithic theory of the geotropic action of roots, together with the results of several original experiments.—Chas. H. Otis.

798. LYNN, M. J. The reversal of geotropic response in the stem. I. The effects of various percentages of carbon dioxide. New Phytol. 20: 116-123. Pl. 1. 1921.—Seedlings of *Helianthus annuus* were placed in a bell jar in such a position that the hypocotyls were horizontal, and then subjected to varying percentages of carbon dioxide in the dark. In all cases where the quantity of carbon dioxide was above 9 per cent there was a reversal of the usual geotropic response, the stems bending downward. From 7 to 9 per cent there was some irregularity, while below 7 per cent the stems behaved normally. When seedlings showing

positive geotropism were placed in the light, so that photosynthesis could go on, the curvature again became normal. The previous history of the seedlings affects the exact point of concentration of carbon dioxide at which curvature is reversed, but it is shown to lie between 7 and 10 per cent. That a true geotropic curvature is involved is shown by the fact that seedlings revolved on a klinostat in an atmosphere of 30 per cent carbon dioxide showed no curvature. The experiments bear out Small's hydrion differentiation theory of geotropism.—*I. F. Lewis.*

799. RICHOME, H. Sur les causes de l'orientation inverse de la racine et de la tige. [On the causes of the difference in orientation of roots and stems.] *Compt. Rend. Acad. Sci. Paris* 173: 167-168. 1921.—Further experiments are described which support the author's suggestion that weight is a factor involved in the negative geotropism of stems. It is believed that weight acts upon the mass of cells in the region of elongation. The development of the leaves and the amount of water in the stem and leaves as affected by transpiration, etc., are believed to have an influence upon negative geotropism.—*C. H. and W. K. Farr.*

REGENERATION

800. CROCKER, WILLIAM. Correlations. [Rev. of: CHILD, C. M., and A. W. BELLAMY. *Physiological isolation by low temperature in Bryophyllum and other plants.* *Science* 50: 362-365. 1919 (see Bot. Absts. 4, Entry 1584).] *Bot. Gaz.* 69: 357-358. 1920.

801. LOEB, JACQUES. The quantitative basis of the polar character of regeneration in *Bryophyllum*. *Science* 54: 521-522. 1921.—Experiments seem to prove that the polar character of the regeneration of shoots is due to the fact that all the materials available for growth reach the apical node of a piece of a stem, but do not reach any of the other nodes.—*C. J. Lyon.*

TEMPERATURE RELATIONS

802. BALDWIN, E. G. Nectar secretion: some observations on the relation between temperature and nectar secretion in greenhouses. *Gleanings from Bee Culture* 49: 489-492. 1921.

803. BIGELOW, W. D. The logarithmic nature of thermal death time curves. *Jour. Infect. Diseases* 29: 528-536. 1921.—The use of semilog paper, instead of coordinate, is suggested for plotting the thermal death time of microorganisms. Between 105 and 125°C. the thermal death time-curves of 15 thermophilic bacteria were found to be logarithmic. By drawing a type curve on a blank sheet of paper, then determining the time necessary to destroy a certain number of spores of a given bacterium, entering the last positive and first negative results in their approximate position on the same paper and drawing through these points lines parallel to the type curve, the thermal death time-curve of the organism is definitely fixed at temperatures of 105 to 125°C. It is suggested that the thermal death time-curve of non spore-bearing bacteria, which will not grow at temperatures of 45-60°C., will probably also be approximately parallel to a type curve.—*Shuman A. Waxman.*

804. JONES, FRED REUEL, and W. B. TISDALE. Effect of soil temperature upon the development of nodules in the roots of certain legumes. *Jour. Agric. Res.* 22: 17-31. *Pl. 1-2.* 1921.—Four legumes, alfalfa (*Medicago sativa*), red clover (*Trifolium pratense*), Canada field pea (*Pisum sativum*), and soy bean (*Glycine max*), suitably inoculated with the proper strain of *Bacillus radiola*, were grown at constant soil temperatures of 3-degree intervals between 12 and 36°C. The air temperature was uniform for all and ranged from 14 to 20°, while the H-ion concentration of the soil solution was not altered by the different treatments. The moisture content of the soil was kept uniform and the concentration of nitrates in the soil, although not controlled, was considered and is thought not to influence the results. Peas were dwarfed at 30°; clover grew poorly at 36°; while alfalfa and soy bean grew well at 36° although optimum growth for soy bean seems to be at 24°C.—The number of nodules formed on the various plants

was not affected at soil temperatures which allowed satisfactory development of the plants.—The size of the nodules, on the basis of dry weight, varied consistently. In soy bean the maximum weight of nodules was secured upon plants grown at 24° and this appeared to be true for the other 3 legumes. The weight of nodules produced by soy bean plants was not found to be correlated with the weight of tops or of roots through the series of temperatures. Weight of tops of plants grown at soil temperatures of 36° was about as great as of those grown at 24°C., but the weight of nodules was much less at the higher temperature. In general, plants with large nodules showed a higher percentage of total nitrogen in the tops.—*D. Reddick.*

805. MATISSE, GEORGES. *La loi d'Arrhenius contre la règle du coefficient de température.* [The law of Arrhenius versus the temperature coefficient rule.] *Arch. Internat. Physiol.* 16: 461-466. 1 fig. 1921.—Attention is called to the fact that the use of the term "van't Hoff's law," when the temperature coefficient rule for a rise of 10°C. is meant, is misleading. There are several laws of van't Hoff in physical chemistry, and moreover the statement originally made by van't Hoff was merely a simple record of an empirical rule to which he attached no great importance, since he pointed out wide deviations and exceptions. The only accurate temperature law is that of Arrhenius, which has been accepted universally by chemists. The formulae for the temperature coefficient rule of van't Hoff and for the law of Arrhenius are given, and it is shown not only that the 2 formulae are different, but that they are incompatible with one another. Curves drawn from the 2 formulae are unlike in character, but practically there is slight difference at low temperatures. Examples are cited in which the temperature coefficients are not in accord with the rule of van't Hoff but do agree in general with the law of Arrhenius.—*C. A. Skull.*

806. SMITH, ERMA, and GRACE MEDES. *Effect of heating the antiscorbutic vitamine in the presence of invertase.* *Jour. Biol. Chem.* 48: 323-327. 1921.—Invertase does not contribute to the destruction of the antiscorbutic vitamin when heated with the vitamin for 4 hours at 76, 55, or 38°C. Heating for 4 hours at 38°C. does not cause an appreciably greater loss of antiscorbutic value than keeping at room temperature.—*G. B. Rigg.*

TOXIC AGENTS

807. BAKKE, L. A., and H. H. PLAGGE. *Studies upon the absorption and germination of wheat treated with formaldehyde.* *Proc. Davenport [Iowa] Acad. Sci.* 26: 365-375. 1919.—This paper tabulates experiments, showing that (1) absorption of water by wheat is the same in ordinary water and in formalin solutions of the strength used for treating seed to prevent smut; (2) wheat soaked in formalin solution for 10 minutes, and then kept enclosed, is not impaired as to germination until after 26 hours of enclosure.—*H. S. Conard.*

808. BOKORNY, TH. *Entgiftung von Lösungen durch Hefe und andere Microorganismen, Enzyme, Proteinstoffe.* [Elimination of toxicity in solutions by means of yeasts and other microorganisms, enzymes, and proteins.] *Centralbl. Bakt. II Abt.* 52: 26-39. 1921.—Yeast placed in 4 per cent aqueous NaOH and in N H₂SO₄ decreased the alkalinity and acidity respectively. Diastase had no such action on H₂SO₄, but various protein compounds, such as blood and muscle albumins and peptone, reduced the acidity of the acid to a less degree than the yeasts. Yeast reduced the strength of solutions of CuSO₄, FeSO₄, oxalic acid, and many other compounds. Algae, bacteria, and some other forms living in water have a similar power of "binding" substances as bases, acids, metal salts, and certain organic compounds through their protoplasmic "albumins." It is suggested that this power of the yeasts, bacteria, diatoms, and some small algae be utilized in consuming the impurities found in water.—*F. S. Wolpert.*

809. COOK, F. C. *Absorption of copper from the soil by potato plants.* *Jour. Agric. Res.* 22: 281-287. 1921.—Soil about potato plants was sprayed with Bordeaux mixture (0.75 per cent copper), Pickering's "A" Bordeaux (0.70 per cent copper), copper sulphate solution (0.75 per cent copper), and with water as a check. Five treatments were made during the season

and 500 cc. of liquid were applied each time about each plant. Quantitative determinations of copper in plants and soil show: (1) Practically the same amount of copper in all the soils; (2) copper sulphate solution injured the roots, and the copper in injured plants was more abundant in roots than in leaves; (3) the insoluble compounds did not injure the plants, and and the accumulation of copper in the plants occurred in the leaves; (4) the excess of lime in Bordeaux mixture over that of the Pickering formula did not reduce the amount of copper absorbed by the plants.—*D. Reddick.*

S10. EFFRONT, J. *L'acclimatation de la levure de bière à l'arsenic.* [Acclimatization of beer yeast to arsenic.] *Compt. Rend. Soc. Belge Biol.* 83: 806-807. 1920.—The conclusions reached are the following: (1) Arsenic in a dose of 75 mg. destroys the yeast by inducing rapid autolysis. But by a progressive acclimatization a tolerance is attained which is 3 times as great as the lethal dose. (2) The yeast acclimatized to arsenic produces, according to the race, either hydrogen sulphite or another compound which neutralizes the action of the arsenic.—*Henri Michels.*

S11. EFFRONT, J. *Sur le mécanisme de l'acclimatation des micro-organismes aux substances toxiques.* [The mechanism of acclimatization of microorganisms to toxic substances.] *Compt. Rend. Soc. Belge Biol.* 83: 807-809. 1920.—The author's conclusions are as follows: (1) The acclimatization of microorganisms to toxins is often due to the development of a substance destroying (neutralizing) the toxin. It is, then, preceded by chemical work. (2) The mechanism of acclimatization resides in a selection and not in becoming accustomed, or becoming acclimatized, properly speaking.—*Henri Michels.*

S12. KOSTER, W. J. *The comparative resistance of different species of Euglenidae to citric acid.* *Ohio Jour. Sci.* 21: 267-271. 1921.—All individuals of *Euglena deses*, *E. aris*, and *E. geniculata* were killed in 0.1 per cent citric acid; all of *E. Ehrenbergii*, *E. oxyuris*, and *Phacus anocoeus* in 0.25 per cent; all of *Euglena gracilis* in 5 per cent. Individual variations in tolerance were exhibited by *E. deses*, *E. Ehrenbergii*, and particularly by *E. gracilis*.—*H. D. Hooker, Jr.*

S13. NOYES, H. A., and J. H. WEGHORST. *Residual effects of carbon dioxide gas additions to soil on roots of Lactuca sativa.* *Bot. Gaz.* 69: 332-336. 5 fig. 1920.—In a previous paper [see Bot. Absts. 1, Entries 1595, 1661] it was shown that roots become variously modified when carbon dioxide is added to the soil in which they grow. Similar modifications are now obtained more than 9 months after the treatments were discontinued. These results "were unexpected, and their explanation is not easy."—*H. C. Coules.*

S14. SCOTT, R. D., and E. G. WILL. *Cider preservatives.* *Jour. Indust. and Eng. Chem.* 13: 1141-1143. 1921.

S15. WOLF, FREDERICK A., and I. V. SHUNK. *Tolerance to acids of certain bacterial plant pathogens.* *Phytopath.* 11: 244-250. 1921.—Six species of bacteria (*Bacillus carotovorus*, *Bacterium campestris*, *B. angulatum*, *B. Tabacum*, *B. Glicinium*, and *B. Sojae*) were grown in both liquid and solid media adjusted to various hydrogen-ion concentrations. In adjusting the P_H value of the media several common organic and inorganic acids were used. It was found that different acids of the same hydrogen-ion concentration did not exert the same influence in inhibiting the growth of the forms studied. Of the acids used malic was the least and acetic the most toxic. All of the acids were less toxic in agar than in bouillon. Considerable variation in the tolerance of the different species to hydrogen-ion concentration was also found.—*L. B. Higgins.*

ELECTRICITY AND MECHANICAL AGENTS

S16. W., S. H. *An example to be avoided.* [Rev. of: BAINES, A. E. *Germination in its electrical aspect.* 185 p., 130 fig. Routledge and Sons: London, 1921.] *New Phytol.* 20: 136. 1921.

MISCELLANEOUS

817. GUTHRIE, C. C. A simplified form of apparatus for air analysis. *Jour. Biol. Chem.* 48: 365-371. 1921.

818. HASTINGS, A. B. A hydrogen electrode vessel adapted for titrations. *Jour. Biol. Chem.* 46: 463-466. 1921.

819. KOLTHOFF, J. M. Berechnung und Bestimmung des Gehaltes in aggressiver Kohlensäure in Trinkwasser. [Calculation of active CO_2 content of drinking-water.] *Zeitschr. Nahrungs- u. Genussmittel* 41: 97-112. 1921.

820. KOLTHOFF, J. M. Bestimmung, Berechnung, und Bedeutung der Wasserstoffionenkonzentration bei der Trinkwasseruntersuchung. [Estimation, calculation, and meaning of hydrogen-ion concentration in studies of drinking-water.] *Zeitschr. Untersuch. Nahrungs- u. Genussmittel* 41: 112-122. 1921.—The hydrogen electrode should not be employed in the estimation of P_H of drinking-water. The colorimetric method with neutral red as indicator gives reliable results. The method is simplified if the blowing-out process is not used. CO_2 content can be easily reckoned from the P_H and bicarbonate content. The hydrogen-ion concentration is unimportant in the evaluation of drinking-water.—*E. E. Stanford.*

821. LÜNNIG, H. Polarimetrische Stärkebestimmung. [Polarimetric estimation of starch.] *Pharm. Zentralhalle* 62: 141. 1921.—It was found that with Ewer's method very good results can be obtained in the estimation of starch polarimetrically when the details of the process are followed exactly. Five gm. of the substance are shaken with 25 cc. of dilute hydrochloric acid (1.124 per cent of HCl by weight) in a 100 cc. graduated flask, 24 cc. of acid of the same strength are added and the flask is placed for exactly 15 minutes into a boiling water bath, shaking well occasionally during the first 3 minutes. After allowing the mixture to cool, water is added to obtain a total volume of 90 cc., followed by 2 to 3 cc. of sodium molybdate solution and sufficient water to the mark. The mixture is then filtered and polarized.—*H. Engelhardt.*

SOIL SCIENCE

J. J. SKINNER, *Editor*

F. M. SCHERTZ, *Assistant Editor*

(See also in this issue Entries 16, 38, 53, 57, 62, 123, 558, 749)

822. ANONYMOUS. Soil problems. *Gard. Chron.* 69: 203. 1921.—An account is given of the meeting of the Faraday Society held in London May 31, 1921. Soil and plant problems were discussed.—*P. L. Ricker.*

823. ANONYMOUS. The fertilizing action of sulphur. *Agric. Gaz. New South Wales* 32: 755. 1921.

824. ANONYMOUS. The management of Willamette Valley soils. *Oregon Agric. Exp. Sta. Bull.* 185, 12 p. 1921.—This is a preliminary report on Oregon soils and soil water investigations. Classification of the soils, reclamation, and fertility problems are discussed.—*C. E. Owens.*

825. AGEE, J. H., and P. P. PETERSON. Soil survey of Nez Perce and Lewis Counties, Idaho. *Advance Sheets Field Operations Bur. Soils U. S. Dept. Agric.* 1917: 5-35. Pl. 1-8, fig. 1-2, map (colored). 1920.

826. ALLEN, E. R., GUY CONREY, W. C. BOARDMAN, OLIVER P. GOSSARD, G. K. SIVASLIAN, and CHARLES N. MOONEY. **Soil survey of Sandusky County, Ohio.** Advance Sheets Field Operations Bur. Soils U. S. Dept. Agric. 1917: 5-62. *Fig. 1, map (colored).* 1920.

827. BURKE, R. T. AVON, and N. ERIC BELL. **Soil survey of St. Clair County, Alabama.** Advance Sheets Field Operations Bur. Soils U. S. Dept. Agric. 1917: 5-44. *Fig. 1, map (colored).* 1920.

828. COLBOURN, H. J. **Report of the agricultural chemist.** Rept. Agric. and Stock Dept. Tasmania 1920/21: 8. 1921.—The author reports chemical analyses of soils upon which grazing cattle have become affected with a wasting disease known as the coastal disease of King Island. The most striking difference between such soils and "healthy" soils is the deficiency in phosphate,—0.088 and 0.050 per cent as compared with 0.340 per cent.—D. Reddick.

829. CUTTER, D. WARD, and L. M. CRUMP. **Daily periodicity in the numbers of active soil flagellates: with a brief note on the relation of trophic amoebae and bacterial numbers.** Ann. Appl. Biol. 7: 11-24. 1920.—In a previous paper were reported the results of periodical counts of the protozoan population in certain Rothamsted fields irrespective of the physiological condition,—cystic or trophic. In accordance with a recent method devised for separating these 2 states, the present paper gives the results of the trophic and cystic protozoa counts. A daily fluctuation was found in the number of trophic forms of the 3 species of flagellates *Oicomonas* sp. (Martin), *Cercomonas longicauda*, and *Bodo* sp. in the soil of arable fields. The numbers of bacteria and trophic amoebae in the soils are correlated, varying inversely over a period of 14 days. Temperature and rainfall appear to have no influence on the numbers of active protozoa in the soil.—H. D. Barker.

830. DEAN, H. K. **The management of sandy soils under irrigation.** Oregon Agric. Exp. Sta. Bull. 177. 26 p., *fig. 1-13.* 1921.—Experiments at the Umatilla Branch Experiment Station shows that large heads of water are necessary for economical irrigation on light sandy soils. The growing of cover crops, especially rye, is recommended to prevent the soil from washing. Bi-weekly irrigation proved best for alfalfa. Mixed grass pastures on the finer sandy soils sometimes give higher returns than hay land.—C. E. Owens.

831. ECKMANN, E. C., MARK BALDWIN, and E. J. CARPENTER. **Soil survey of the Middle Gila Valley Area, Arizona.** Advance Sheets Field Operations Bur. Soils U. S. Dept. Agric. 1917: 5-35. *Pl. 1-2, pl. A (colored), fig. 1, map (colored).* 1920.

832. GUTHRIE, F. B., and R. M. PETRIE. **The value of soil analyses to the farmer.** Agric. Gaz. New South Wales 32: 627-628. 1921.

833. HUTTON, F. Z., B. H. HENDRICKSON, MELVIN THOMAS, and SPENCER BUSTER. **Soil survey of Sargent County, North Dakota.** Advance Sheets Field Operations Bur. Soils U. S. Dept. Agric. 1917: 5-40. *Fig. 1, map (colored).* 1920.

834. KEDING, FRITZ. **Die Ansichten über Bodengare im Laufe der Zeiten.** [The views regarding tilth held in the course of the ages.] Mitteil. Deutsch. Landw. Ges. 36: 594-598. 1921.—The author briefly reviews the ideas on soil tilth held by the ancients, by the people of the middle ages, and by later scientific workers. The author concludes that soil fertility is a product of climatic conditions, soil colloids and microorganisms.—A. J. Peters.

835. KOCHLER, A. E., E. J. CARPENTER, C. V. RYZEK, and J. E. COOTER. **Soil survey of Yamhill County, Oregon.** Advance Sheets Field Operations Bur. Soils U. S. Dept. Agric. 1917: 5-65. *Pl. 1-5, fig. 1, map (colored).* 1920.

836. PEROTTI, RENATO. *Ricerche e studi compiuto o in corso presso il Laboratorio di Batteriologia Agraria della Reale Stazione di Patologia Vegetale.* [Researches completed or in progress.] *Boll. Mens. R. Staz. Patol. Veg.* 1: 155-156. 1920 [1921].—This abstract of work on ammonification, particularly of organic nitrogen and the cyanogens, includes a note on the root tubercles of *Diplotaxis erucoides*.—*D. Reddick.*

837. POWERS, W. L., and WARD CRETCHER. *Farm drainage.* *Oregon Agric. Exp. Sta. Bull.* 178. 47 p., fig. 1-8. 1921.—The types of wet land in Oregon are described and methods of draining each are discussed.—*C. E. Owens.*

838. RUSSELL, E. J. *Soil and soil management.* [Rev. of: (1) EMERSON, F. V. *Agricultural geology.* xviii + 319 p. John Wiley & Sons: New York; Chapman and Hall: London, 1920. (2) BENNETT, H. H. *The soils and agriculture of the Southern States.* xviii + 399 p., + 1 pl. The Macmillan Co.: New York and London, 1921. (3) WEIR, W. W. *Productive soils; the fundamentals of successful soil management and profitable crop production* (Lippincott's Farm Manuals). xvi + 338 p. J. B. Lippincott Co.: Philadelphia and London, 1921. (4) HARRIS, F. S. *Soil alkali: its origin, nature and treatment* (Wiley Agricultural Series). xvi + 258 p. John Wiley and Sons: New York; Chapman and Hall: London, 1920. (5) JEFFERY, J. A. *Textbook of land drainage* (Rural Textbook Series). xx + 256 p. The Macmillan Co.: New York and London, 1921. (6) DOYLE, K. D. *Agriculture and irrigation in continental and tropical climates.* xv + 268 p. Constable and Co.: London, 1921.] *Nature* 108: 7-9. 1921.—The reviewer does not agree with the unqualified statement of Weir regarding application of the law of diminishing returns to fertilizers. Recent experiments in England indicate that the return increases at first in a greater proportion than the amount of fertilizer used.—*O. A. Stevens.*

839. STEVENS, E. H. *Soil survey of Accomac and Northampton Counties, Virginia.* Advance Sheets Field Operations Bur. Soils U. S. Dept. Agric. 1917: 5-59. Pl. 1-4, fig. 1, map (colored). 1920.

840. VEATCH, J. O., and H. G. LEWIS. *Soil survey of Lubbock County, Texas.* Advance Sheets Field Operations Bur. Soils U. S. Dept. Agric. 1917: 5-31. Pl. 1-2, fig. 1, map (colored). 1920.

TAXONOMY OF VASCULAR PLANTS

J. M. GREENMAN, *Editor*

E. B. PARSON, *Assistant Editor*

(See also in this issue Entries 135, 143, 144, 145, 152, 233, 290, 397, 433, 439, 445, 451, 456.)

GENERAL

841. ANONYMOUS. *New South Indian species.* *Jour. Indian Bot.* 2: 200-212. 1921. — Brief notes are presented on 43 new species, belonging to 22 genera from South India, described by Gamble in the *Kew Bulletin* (1919 and 1920).—*Winfield Dodgeon.*

842. BARTON, W. C. *Report of the distributor for 1918.* *Bot. Soc. and Exchange Club British Isles Rept.* 5: 483-545. 1918 [1919].—Specimens distributed number 5340.—*G. C. Druee.*

843. BRITTON, N. L. *Plant nomenclature: more suggestions.* *Jour. Botany* 59: 296-297. 1921.—The author refers to T. A. Sprague's article on plant nomenclature in *Jour. Botany* 59: 153-160. 1921 [see *Bot. Absts.* 10, Entry 810].—*S. H. Barnham.*

844. DRUCE, G. CLARIDGE. The extinct and dubious plants of Britain. Bot. Soc. and Exchange Club British Isles Rept. Suppl. 5: 731-799. 1919 [1920].

845. GROVES, J. Plant nomenclature: more suggestions. Jour. Botany 59: 294-296. 1921. —The author refers to T. A. Sprague's article on plant nomenclature in Jour. Botany 59: 153-160. 1921 [see Bot. Absts. 10, Entry 810].—S. H. Burnham.

846. NAKAI, TAKENOSHIN. Precursores ad Floram Sylvaticam Koreanam, XI. Bot. Mag. Tôkyô 35: 1-18. 1921.

847. REHDER, A. Plant nomenclature: more suggestions. Jour. Botany 59: 289-294. 1921.—The author refers to T. A. Sprague's article on plant nomenclature in Jour. Botany 59: 153-160. 1921 [see Bot. Absts. 10, Entry 810].—S. H. Burnham.

PTERIDOPHYTES

848. BUTTERS, F. K. A new western species of *Pellaea*. Amer. Fern Jour. 11: 39-40. 1921.—The article is a preliminary note on the description of *Pellaea Suksdorfiana* Butters, sp. nov., formerly published under the name *Pellaea glabella* Mett. ex Kuhn var. *simplex* Butters.—F. C. Anderson.

849. BUTTERS, F. K. *Salvinia* in Minnesota. Amer. Fern Jour. 11: 48-50. 1921.—*Salvinia natans* (L.) All. reported as occurring in the vicinity of Minneapolis is probably *S. auriculata* var. *Olfersiana* Klotzsch ex Baker, and since it will not survive a northern winter it is improbable that it is a native of the state of Minnesota, or has ever lived there outside of greenhouses.—F. C. Anderson.

850. CHRISTENSEN, CARL. An overlooked species of *Dryopteris*. Amer. Fern Jour. 11: 44-46. 1921.—*Dryopteris crypta* (Underw. & Maxon) C. Chr. & Maxon, comb. nov., is a Cuban species formerly published under the name *Polypodium cryptum* Underw. & Maxon. The range and distinguishing characteristics are pointed out.—F. C. Anderson.

851. MAXON, WILLIAM R. Notes on American ferns—XVII. Amer. Fern Jour. 11: 33-39. 1921.—The range is corrected and extended for 6 species of pteridophytes. *Selaginella scopulorum* Maxon, sp. nov., is described. Its range is given and also a comparison with closely related species.—F. C. Anderson.

852. RIDLON, H. C. A new *Polypodium* from Vermont. Amer. Fern Jour. 11: 46-48. Pl. 1. 1921.—The article consists of a discussion and description of this new fern, namely, *Polypodium vulgare* forma *rotundatum* Ridlon, n. f.—F. C. Anderson.

853. WEATHERBY, C. A. Other records of *Salvinia* in the United States. Amer. Fern Jour. 11: 50-53. 1921.—*Salvinia natans* (L.) All. seems to have a doubtful claim to a place in the U. S. A. flora. It seems that the plants collected in New York State are *Salvinia auriculata* var. *Olfersiana* instead of *S. natans*, and that these collections were made the same season the species was planted. One collection of *S. natans* was made in Perry County, Missouri, but has not been repeated in 35 years.—F. C. Anderson.

SPERMATOPHYTES

854. ANONYMOUS. [Rev. of: Fyson, P. F. The flora of the Nilgiri and Pulney hill tops,—being the wild and commoner introduced flowering plants of the hill-stations of Ootacamund, Kodaikanal and Kotagiri. Vol. III including the country round Coonoor and down to 5,000 ft. Illustrations by Mrs. Fyson and others. Government Press: Madras, 1920.] Jour. Indian Bot. 2: 211-215. 1921.

855. ANONYMOUS. [Rev. of: PRAEGER, R. LLOYD. An account of the genus *Sedum* as found in cultivation. Jour. Roy. Hort. Soc. 46: 1-314. 185 fig. 1921.] Jour. Botany 59: 269-272. 1921.

856. BLACK, J. M. Additions to the flora of South Australia. No. 19. Trans. Roy. Soc. South Australia 45: 5-24. Pl. 2-4. 1921. Species belonging to 23 families are listed, with names of collectors, localities at which they were collected, and in many cases brief descriptions and notes. Three new species, *Salicornia pachystachya*, *Calandrinia disperma*, and *Calanthis ancyrocarpa*, are described and figured, 1 new variety, *Leptorrhynchus tetrachaetus* (Schlecht.) var. *penicillatus*, is named, and it is suggested that the plant formerly described as *Helipterum Troedlii* var. *patens* is really a variety of *H. roseum*.—H. B. Sifton.

857. BLAKE, S. F. Five new species of *Cedrela*. Proc. Biol. Soc. Washington [D. C.] 33: 107-112. 1920.—*Cedrela discolor*, *C. Rosei*, *C. rotunda*, *C. Whitfordii*, and *C. yucatanica* are described as new species of Spanish cedar from Mexico, Central America, and South America.—J. C. Gilman.

858. BLAKE, S. F. New trees and shrubs from Mexico and Guatemala. Proc. Biol. Soc. Washington [D. C.] 33: 117-120. 1920.—*Capparis hexandra*, *Jatropha sympetala*, *Guarea obtusata*, *Russelia obtusata*, and *R. tetraptera* are described as new.—J. C. Gilman.

859. BLAKE, S. F. Two new salvias from Guatemala. Proc. Biol. Soc. Washington [D. C.] 33: 113-116. 1920.—*Salvia Holwayi* and *S. Popenoei* are described as new species which will probably be of horticultural value.—J. C. Gilman.

860. BOLUS, L. South African Proteaceae. Jour. Bot. Soc. South Africa 7: 13-15. 1 pl. 1921.

861. BOULGER, G. S. *Lathraea Squamaria* L. parasitic on yew. Jour. Botany 59: 301. 1921.

862. BREAKWELL, E. The scientific name of Kikuyu grass. Agric. Gaz. New South Wales 32: 516. 1921.

863. BRITTEN, JAMES. *Impatiens glandulifera* Royle. Jour. Botany 59: 264-265. 1921.—The varietal name *candida* (Lindley) must replace *alba* as proposed by Britten [see Bot. Abstr. 8, Entry 713].—S. H. Burnham.

864. BURKILL, I. H. Orchid notes. Gardens' Bull. Straits Settlements 2: 441-444. 1921.—The Malayan orchid, *Bulbophyllum limbatum* Lindl., is described from life. The following are added to the flora of the Malay Peninsula: *Eulophia macrostachya* Lindl., *Spathoglottis affinis* de Vriese, and *Acanthephippium sylvetense* Lindl. The flowers of the last named are described. An unusually large individual of *Gastrodia malayana* Ridl. is recorded.—I. H. Burkill.

865. BURKILL, I. H. The correct botanic names for the White and the Yellow Guinea yams. Gardens' Bull. Straits Settlements 2: 438-441. 3 pl. 1921.—The author suggests that the White Guinea yam should be called *Dioscorea rotundata* Poiret. and agrees that the Yellow Guinea yam is *D. cayennensis* Lam. The differences in the foliage of the 2 are indicated, and the tubers of races of both, and of *D. dumetorum* Pax, are figured. Both the Guinea yams and *D. alata* Linn., were early taken to the New World; and in some of the West Indies the names Negro, Guinea, and Lisbon yams apply to *D. rotundata*, *D. cayennensis*, and *D. alata* respectively.—I. H. Burkill.

866. CLAUSEN, J. **Studies on the collective species *Viola tricolor* L.** Bot. Tidsskr. 37: 205-222. Pl. 1-3. 1921.—This investigation involves a study of the systematic relationship and cytology of *Viola tricolor*. Clausen departs from the usual path and utilizes Raunkiaer's system, classifying the species according to (1) size of petals, (2) character of stigma, (3) presence or absence of a dark spot in front of style, (4) pollen magazine, (5) honey streak on the spur-bearing petal—whether branched or not, and (6) color of petals. The number of chromosomes varies, but is usually 26. In *V. arvensis* there are 34. However, Winge has found 20 chromosomes for *V. odorata*.—A. L. Bakke.

867. DESHMUKH, G. B. **The Brazil-nut tree in Singapore.** Gardens' Bull. Straits Settlements 2: 435-438. 1921.—From a study of the trees of the Brazil nut in the Botanic Gardens, Singapore, the author supports T. W. Peteh's conclusion that *Bertholletia excelsa* Humb. & Bonpl. and *B. nobilis* Miers are not separable species.—I. H. Burkell.

868. GLEASON, H. A. **A rearrangement of the Bolivian species of *Centropogon* and *Siphocampylus*.** Bull. Torrey Bot. Club 48: 189-201. 1921.—A conspectus is given of 40 species belonging to the 2 genera, the following being worthy of special mention: *Siphocampylus tunicatus* A. Zahlb. in herb., *S. altiscandens* sp. nov., and *Centropogon aggregatus* (Rusby) comb. nov.—P. A. Munz.

869. GODFREY, M. J. **A new European *Serapias*.** Jour. Botany 59: 241-244. Pl. 560. 1921.—*Serapias gregaria*, a native of France, is described as new to science.—S. H. Burnham.

870. GREVES, SUSIE. **A revision of the Old World species of *Vellozia*.** Jour. Botany 59: 273-284. 1921.—The author enumerates and gives keys for 37 African, Mascarene, and Arabian species. *Vellozia Mouroi*, *V. Eylesii*, and *V. suarcolens*, natives of Africa, are described as new.—S. H. Burnham.

871. LINGELSHIM, ALEXANDER. **Notiz über fluoreszierende Stoffe in der Rinde der Calycanthaceen.** [Note on fluorescent substances in the cortex of the Calycanthaceae.] Ber. Deutsch. Bot. Ges. 37: 73-75. 1919.—Portions of the cortex of dried herbarium specimens as well as of fresh shoots of certain *Calycanthus* species gave a strong fluorescence when placed in water. No fluorescence was observed when the petioles, leaves, wood, pith, or flower parts were used, even when these were from living plants. *Chinanthus peuceux* and *C. nitens* (members of a genus which though included in *Calycanthus* by Linnaeus is separated from that genus by most systematists, Prantl and Koehne excepted) gave fluorescence, but with strong greenish light reflex, when portions of the cortex were placed in water. The author suggests that this affords an example of how fluorescence phenomena may be practically employed for the recognition of species complexes which belong together.—R. M. Holman.

872. McATEE, W. L., and F. P. METCALF. **Notes on cockleburrs (Ambrosiaceae; *Xanthium*) of the District of Columbia and vicinity.** Proc. Biol. Soc. Washington [D. C.] 33: 177-180. Pl. 4. 1920.—Five species of *Xanthium* are listed from the District of Columbia; a key for their identification is given.—J. C. Gilman.

873. MERRILL, ELMER D. **A new genus of Myrsinaceae from the Philippines.** Philippine Jour. Sci. 17: 695-698. 1920.—Specimens formerly described as *Discoedyle microcarpa* Elm. are found to differ definitely from the type and are placed in a new genus, *Apota*, which is described.—Albert R. Sweetser.

874. MERRILL, ELMER D. **Myrmeconuclea, a new genus of rubiaceous plants from Palawan and Borneo.** Philippine Jour. Sci. 17: 375-376. 1920.—The generic name is from the Greek for ant. A certain percentage of the branchlets present hollow swellings which are inhabited by colonies of small ants. —Albert R. Sweetser.

